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ANALYSIS FOR ADULTERATION OF COMMERCIAL PEPPER.

By James Edgar Stevenson Bell, Ph. G.

From an Inaugural Essay.

The belief that most of the spices in common use as condiments are largely adulterated is quite prevalent and rapidly gaining ground. This is especially true with regard to the most familiar and largely used of all, *black pepper*, which, owing to its color and structure, is easily adulterated. It is very important that all articles used as foods or in connection with them should be as pure as possible, and it was with a view of determining whether the popular belief is true with regard to the familiar spice named, that the writer undertook the examination herein described. In order to make the results as representative and reliable as possible the samples were obtained from widely separated sources. Eleven of the samples were procured by friends in the respective cities named in the *table of results*, and forwarded by mail. They were bought in grocery stores in the ordinary course of trade, the object being to get a fair average of the brands in common use throughout the country. The remaining samples were procured here.

Of the twenty samples employed, all were examined both chemically and physically.

The important constituents of pepper are an alkaloid (piperine), the volatile oil, and the resin, and upon these ingredients its value as a condiment depends. It was not deemed necessary for the purpose in view to separate the piperine and resin, nor was it considered important to estimate the volatile oil which was allowed to escape during evaporation. The figures indicating the percentage of moisture are consequently slightly in excess, as they include the entire loss sustained by the ethereal extract in evaporation.

The object of the chemical examination was to determine the percentage of piperine and resin, moisture, and ash, and its proximate constituents.

CHEMICAL EXAMINATION.

1. *Moisture.* Ten grammes of each sample were dried in an air-bath at 100° C. until there was no loss in weight.

2. *Piperine and Resin.* Ten grammes of each sample were exhausted with stronger ether (Squibb's), the extract evaporated in tared evaporating beakers, and weighed.

3. *Ash.* Two grammes of each sample were incinerated in weighed crucibles, and the weight obtained. The several ashes were treated with hydrochloric acid, the solution filtered, hydrogen sulphide passed through it, and further treated with ammonium sulphide. None of the filtrates gave any appreciable coloration or precipitate with the former reagent, nor did the precipitate by the latter indicate an undue amount of iron.

The results of the above examination, together with the source whence each sample was obtained, are embodied in the following table.

TABLE SHOWING SOURCE AND RESULTS OF ANALYSES OF TWENTY SAMPLES OF BLACK PEPPER.

No.	Where Ground or Obtained.	Moisture.	Ash.	Piperine and Resin.	Remarks
1.	Philadelphia, Grinder,	9·90	4·50	7·85	Pure.
2.	London, Eng., Grocery,	9·08	5·48	6·75	"
3.	Boston "	10·69	5·02	6·46	"
4.	New York "	10·29	4·98	6·84	"
5.	Philadelphia "	11·81	5·39	6·02	"
6.	" "	11·34	7·92	4·27	Adulterated.
7.	Baltimore "	12·25	7·37	4·11	"
8.	" "	11·02	5·17	5·83	Pure.
9.	Pittsburgh "	10·78	4·91	5·98	"
10.	Chicago "	9·46	5·90	6·54	"
11.	San Francisco "	10·12	5·12	6·89	"
12.	" " "	10·63	4·93	7 29	"
13.	Los Angeles "	10·86	4·63	6·96	"
14.	" " "	9·21	4·92	7·18	"
15.	" " "	9 53	4·65	7·08	"
16.	Philadelphia Drug Store,	10·14	4·87	6·98	"
17.	" " "	9·91	5·37	7·18	"
18.	" Grocery,	9·01	6·75	6·45	"
19.	" "	12·60	7·25	3·74	Adulterated.
20.	" "	11·93	8·59	3·29	"

An examination of this table shows:

(*a*) That pure pepper may contain from nine to twelve per cent. of moisture.

(*b*) That the amount of ash in pure pepper ought not to exceed six per cent.

(*c*) That pure pepper contains from five to eight per cent. of piperine and resin, and that less than 4·5 per cent. is evidence of sophistication.

Authorities differ widely upon the relative amounts of the above constituents. The extremes given are:

Piperine and resin	5·25 to 8·15 per cent.
Moisture	9·22 to 14·36 "
Ash	4·35 to 8·89 "

Niederstadt says that genuine black pepper should yield 7·66 per cent. of *piperine*. This is certainly in excess of the amount usually obtained, and a sample not reaching this limit is not necessarily impure. Probably from 4·5 to 5·5 per cent. is nearer correct. It should be remembered that the source from whence the pepper was originally obtained, as well as the conditions to which it has been subjected after being taken from the plant, have much to do with the results of a chemical determination; for pure peppers differ considerably in their important constituents, especially if, after curing, they have been subjected to varying conditions. The appearance of the evaporated ethereal extract must be carefully noted, as it affords an excellent clue to possible adulteration. It should be dry, somewhat scaly, and the resin should show numerous projecting crystals of piperine. If it has a dark, oily appearance and is mostly amorphous, adulteration is indicated.

All peppers, whether pure or not, contain more or less sand, and the excess in weight of ash in some of the samples containing the normal amount of piperine and resin is attributable to sand, since in each case there was a sufficient amount of insoluble residue after treating with hydrochloric acid to account for it. No determination of starch was made, since the ingredients used as adulterants frequently contain more starch than the pepper itself; hence such a determination would be of doubtful value.

Physical Examination.—This mode of examination is absolutely essential to a thorough analysis of pepper, since many of the impurities are much better detected by it than by chemical tests. The examiner must familiarize himself with the structure of pure pepper and

with that of the various adulterants used in order to be able to recognize them with the aid of a microscope. This is not specially difficult if one has had some practice in manipulating a microscope and in mounting sections. The excess of moisture and ash, and the deficiency in the amount of ethereal extract, as well as the appearance of the latter, in Nos. 6, 7, 19 and 20, being sufficient to render them suspicious, they were subjected to a further *physical* examination. No. 1, which was obtained from a well-known and reliable grinder in this city and known to be pure, was taken as the standard in this as well as in the chemical examination. Samples of each were sifted successively through No. 40, No. 50 and No. 60 sieves, and the portions thus separated subjected to a careful microscopic examination, which revealed a number of abnormal structures, among which were detected pepper stems, charcoal, hulls of mustard seeds, ground corn and beans, small fragments of cocoanut shells, and various unrecognizable impurities. The impurities found were chiefly inert, and while objectionable on account of their diluent effect as well as for other reasons, were not specially deleterious. All the other samples were similarly examined but nothing abnormal was found.

Conclusions.—The conclusions I have drawn from the foregoing analyses are

1. The amount of moisture in pepper is so variable that it alone is no criterion by which to judge of the quality of a given sample.

2. The ash is also a variable factor, and, unless quite excessive, is not a sufficient indication of impurity.

3. Excess of either ash or moisture, coupled with a marked deficiency of ethereal extract (piperine and resin) is a good indication of impurity.

4. The impurities most likely to be met with in peppers ground in this country are those mentioned above, which are either inert or harmless.

5. Metals and alkaline earths are, as a rule, present only to a slight extent.

6. An expertly conducted physical examination must accompany the chemical in order to *thoroughly* test a sample of pepper.

7. The popular notion that ground peppers are extensively and grossly adulterated, while partly true, is mainly a false one.

8. Consumers who are willing to pay a fair price for pepper will seldom be imposed upon with an adulterated article.

COMPOSITION OF PRECIPITATED FERROUS SULPHATE.[1]

By Henry Trimble.

Query No. 7.—Is the precipitated sulphate of iron of constant composition? Does it contain the same proportion of water of crystallization as the large crystals?

As inquiry at several stores in Philadelphia revealed the fact that this officinal preparation is not usually kept in stock, I made the experiments on four samples prepared by myself. No. 1 was made according to the U. S. P. No. 2 according to the Br. P., with the quantity of water reduced to twenty per cent., and without boiling the solution. No. 3 according to the proportions of the Br. P., omitting the boiling; as this solution was quite dilute, the yield was small. No. 4 was made exactly according to the directions of the Br. P. This authority directs that the solution be boiled for ten minutes in an open dish, but leaves one in doubt whether to take into account the loss by evaporation or not; therefore if the strength of the solution and consequently the proportion of alcohol affect the composition, it will be shown by samples 3 and 4. The directions for getting rid of adhering moisture and acid are not so exact as our own, consequently a slight excess of acid will be found in the Br. P. samples. In the following results, the amount of iron was determined by both gravimetric and volumetric methods, the latter being by titration with potassium permanganate. The results by the two methods were not materially different. The sulphuric acid was determined by barium chloride.

	No. 1. U. S. P.	No. 2. Br. P. less 20 p. c Water, not boiled.	No. 3. Br. P. Not boiled.	No. 4. Br. P.	No. 5. Larger Crystals.	Theoretical.
Fe.....	20·48 p.c.	20·86 per cent.	20·35 p.c.	20·37 p.c.	20·53 p.c.	20·12 p.c.
SO_4.....	35·40 "	35·84 "	35·40 "	35·44 "	36·40 "	34·54 "
H_2O.....	44·12 "	43·30 "	44·25 "	44·19 "	43·07 "	45·34 "
Total.....	100·00	100·00	100·00	100·00	100·00	100·00

[1] Read at the Detroit meeting of the American Pharmaceutical Association; communicated by the author.

No. 5 settled out from the filtrate of No. 3, which was more dilute than the others and therefore contained a larger quantity of the salt. The deposit took place during three weeks, in granular crystals much larger than in the other samples.

None of the specimens when first made gave more than slight indications of ferric iron and the determinations by potassium permanganate failed to indicate any appreciable quantity. The above results are sufficient to show that the salt precipitated under different conditions is of constant composition.

This is contrary to the results gotten by Barkhausen (Archiv der Pharmacie, Band 148, 1871), who found it to contain less than $7H_2O$, and to lose moisture rapidly on exposure to air. His results may be attributed to the method used in analysis (with calcium hypochlorite), or to over-drying the salt in its preparation.

L. Caro (Liebig's Annalen, 165, 29) contradicted these statements and found the salt to contain $7H_2O$, and to remain of the same composition after a month's exposure to the atmosphere. While I can agree with the first part of Caro's statement, which has also been verified by Tilden (*Phar. Jour. and Trans.*, 3, 11, p. 1026), it is difficult to believe that this salt will remain unchanged for a month when exposed to the atmosphere.

To investigate this, portions of samples 1, 2, 3 and 4 were placed on filter paper loosely covered with the same, and exposed to the air in a room without artificial heat, well ventilated, with a temperature varying between 55° and 90° F. (13° and 32° C.) for a month.

As the change appeared to be on the surface the samples were well mixed and bottled. The ferrous and total iron were estimated by titration with potassium permanganate, with the following results:

	1.	2.	3.	4.
Fe. as ferrous.....	20·92	21·86	21·74	21·72
Total Fe.....	21·12	21·86	21·74	21·92

By calculation we get the following percentages of water: No. 1, 42·45; No.2, 40·67; No. 3, 40·94; No. 4, 40·28.

It will be seen that oxidation took place in two of the samples only,

and even in them it was almost insignificant, but that there was a loss of about four per cent. of water, which is almost the equivalent of one molecule.

A sample which had been kept in a glass-stopped bottle for several years was also examined and found to have the composition of the officinal salt; the bottle had been frequently opened for the removal of a portion of its contents, and at the time of the examination was nearly empty.

Precipitated sulphate of iron, then, is of constant composition, and is the same as the large crystals; it keeps well in glass-stopped bottles, but loses water, and is slowly oxidized on exposure to the atmosphere.

Philadelphia, July 16, 1888.

MAYER'S REAGENT FOR THE ESTIMATION OF ALKALOIDS.[1]

By H. W. Snow, Ph. C.

Two years ago Dr. A. B. Lyons presented to this Association a paper on the estimation of alkaloids by Mayer's Reagent, which is, I believe, the most exhaustive and thorough paper ever published on this subject. In fact, it is my opinion that comparatively little remains to be said; at least so far as immediately practical results are concerned, and, consequently I feel some hesitation in travelling again over the same ground, particularly as the experiments performed by me have been far more limited in number than those from which Dr. Lyons drew his conclusions. It is, therefore, well to say at once that this paper is intended more particularly to draw attention to a method of interpreting the results of titrations, rather than with the expectation of advancing any new and hitherto unknown facts bearing on the use of this reagent. In your proceedings of last year in connection with the assay of ipecac, and again at a later date, in connection with the assay of aconite in the New Idea, I gave tables for the interpretation of the results of titrations of the alkaloids contained in those drugs, and it is these tables, somewhat extended and similarly applied

[1] Read before the Michigan State Pharmaceutical Association, at its meeting in Detroit, September, 1888, and communicated by the Author.

to a number of alkaloids, that I wish to again bring forward in a paper immediately upon the subject of Mayer's reagent. The experiments which form the basis of this paper have been performed at odd intervals during a year or more past, and were primarily undertaken with a view of familiarizing myself to some extent with the peculiarities exhibited by the different alkaloids on treatment with Mayer's reagent. The experiments, though not bringing forward much that is new, may stand in some measure at least as confirmations of earlier work, and thus give increased value to that which has preceded. The method of interpreting the results of titrations is very simple, and consists, first, in determining the titration equivalents for alkaloid in different degrees of dilution. Then, when working on unknown material, by holding the dilution of the initial fluid always constant, the number of cubic centimeters of reagent required to precipitate the alkaloid becomes an index to the degree of dilution of the alkaloid, and thus enables the analyst to select the true experimental equivalent for calculating the weight and, finally, the percentage of alkaloid. The full details of calculating the tables are most easily understood by following out the actual on an alkaloid, and this workis given for the sake of illustration in the case of aconitine.

MANNER OF USING TABLES.

The manner of using the tables is the same for all the alkaloids, and in illustration let us take aconitine. Bring the volume of fluid containing the alkaloid to the volume indicated at the head of the table, in our instance 20 cc., titrate with the reagent, and as hereinafter described, and note the amount required to completely precipitate the alkaloid. Suppose that from 10 grammes of aconite root the alkaloid required 4·8 cc. reagent, referring to the first column of our table we find that this indicates a dilution of 1 part in 300, and that the experimental equivalent for the alkaloid in that degree of dilution is .014 then (·014 × 4·8) × 10=0·67 per cent. alkaloid. Instead of 4·8 cc. suppose that 6·3 cc. had been required. Again referring to the table, we note that this indicates a dilution between 1 part in 200 and 1 part in 250, and the equivalent to use in the calculation might betaken for either degree of dilution, or if for any reason we desired to split hairs ·01415 might be taken as the

average between ·0142 and ·0141, this would give us a percentage of (01415 × 6·3) × 10=0·89 per cent. alkaloid.

THE REAGENT.

All titrations and tables in this paper refer to a solution containing 6·775 grammes of mercuric chloride and 25 grammes of potassium iodide to the litre (n), and is consequently a solution of half the strength of that originally recommended by Mayer.

METHOD OF TITRATION.

As the method of titration in some instances at least influences the results, it is recommended that all who may use these tables should pursue the following convenient course.[1] Run in from ½ to 1 cc. of reagent, after stirring allow to stand one or two minutes before again running in a like quantity, and as before, after stirring, allow to stand a minute or two, finally as it becomes apparent that the end of the reaction is nearly reached the fluid is to be passed through a small dry filter paper, best of a size to just conveniently hold all of the liquid, allowing most of the fluid to pass through before again testing with a drop of the reagent. The final end is best determined by taking out four or five drops of the filtrate in a watch glass placed on a dark surface and adding one drop of the reagent. If a precipitate does not appear on standing half a minute or so the end may be considered as reached. If a precipitate does appear the fluid is to be returned to the main portion and the operation continued.

ACONITINE.

The writer reported a number of experiments some time ago on this alkaloid.[2] Results of titrations are on the whole very satisfactory, and the end reaction is quite distinct and well marked. The alkaloid may be regarded as belonging on the list of those for which Mayer's reagent may be used advantageously as a means of estimation. Experiment shows each cc. of the reagent precipitates in faintly acid solutions amounts as follows for different degrees of dilution:

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[2] Pharm. Era, ii-20 from New Idea, Oct. 1887-616.

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[2] Pharm. Era, ii-20 from New Idea, Oct. 1887-616.

1 in 200	·0142
1 in 300	·0140
1 in 400	·0136
1 in 500	·01286
1 in 600	·01163

The precipitates from 0·100 of alkaloid, when collected, dried and weighed, ran from 0·162 to 0·179, with an average of 0·173 corresponding to 55·9 per cent. to 61·7 per cent., with average of 57.8 per cent. alkaloid. It is observed that aconite root and fluid extracts of the drug contain not far from 0·75 per cent. alkaloid as an average estimated as aconitine. Occasionally the amount will exceed one per cent. and rarely fall below ½ per cent. It will also be noted that for dilutions of one part in 200 to one part in 300 the alkaloid gives the best results in titration, while for less than one part in 400 the results begin to vary considerably. It is therefore evident that a dilution should be adopted in which the alkaloid should be present in from one in 200 to not less than one in 400, and in the case of fluid extracts this dilution would be 20 cc. representing 10 cc. of fluid extract and therefore this dilution was adopted.[1] The figures in the table were obtained as follows: A fluid measuring 20 cc. may be said to weigh 20 grammes. If it contains one part in 200 of alkaloid it is evident that there is 0·100 grammes (20 ÷ 200 = 0·100) of alkaloid present in it. In a dilution of one in 200 Mayer's reagent precipitates 0·0142 of alkaloid and 7·04 cc. (0·100 ÷ ·0142 = 7·04) of reagent are required to precipitate the whole of the alkaloid. This gives the figure for the first column, the equivalent goes into the third column, while the degree of dilution makes up the second column. For one in 500 a similar course is followed, not forgetting that in dividing the weight of the alkaloid by the equivalent we must use the equivalent for one in 500 and not for one in 200 as in the first case and this is true for all the data in the first column. By following this course it is easy to see how the first column becomes an index to the degree of dilution and enables the analyst to select the proper equivalent for his calculations.

On this basis the following table has been constructed for the interpretation of the results of titration:

[1] 10 cc. of a fl. ex. or 10 grammes of a drug containing 1·00 per cent. alkaloid would yield when diluted to 20 cc. a fluid containing one part in 200 of alkaloid. If it only contained ½ per cent. alkaloid this would correspond on diluting to 20 cc. to a fluid containing one part in 400, and it will thus be seen that the range is the one best suited to determinations of the alkaloid.

Fluid measures 20 cc.[1] and contains 2 cc., 1 per cent. by vol., sulphuric acid.[2]

Cc. required.	Dilution.	Equivalent.
3·11[3]	1 in 500	·01286
3·37	1 in 450	·0132*
3·68	1 in 400	·0136
4·13	1 in 350	·0138*
4·76	1 in 300	·0140
5·67	1 in 250	·0141*
7·04	1 in 200	·0142

The fluid measures 30 cc. and contains 3 cc., 1 per cent. by vol., sulphuric acid.

Cc. required.	Dilution.	Equivalent.
4·31	1 in 600	·0116
4·67	1 in 500	·01286
5·05	1 in 450	·0132*
5·51	1 in 400	·0136
6·21	1 in 350	·0138*
7·15	1 in 300	·0140
8·50	1 in 250	·0141*
10·56	1 in 200	·0142

Fluid measures 25 cc. and contains 2½ cc., 1 per cent. by volume, sulphuric acid.

Cc. required.	Dilution.	Equivalent.
3·89	1 in 500	·01286
4·21	1 in 450	·0132*
4·59	1 in 400	·0136
5·17	1 in 350	·0138*
5·95	1 in 300	·0140
7·09	1 in 250	·0141*
8·80	1 in 200	·0142

* In the case of this as in all other alkaloids mentioned in this paper, the equivalents marked with an asterisk are interpolations, all others were experimentally determined.

[1] I originally recommended 30 cc. as the dilution best suited for this table, intending thus to include those drugs containing as much as 1·2 to 1·3 per cent. of alkaloid, but as these are rather the exception than the rule the smaller volume as pointed out by the Editor of the *Pharm. Era* is to be preferred. The 30 cc. table, likewise a 25 cc. table, is however here given, as they may sometimes be of use.

[2] The volumes given at the head of the tables refer to the volume which the fluid should have at the beginning of the titration.

[3] In practice reading is of course only to tenths of cc. but in the tables readings have been calculated to hundredths for sake of mathematical exactness; they may always be read to the nearest tenth.

BERBERINE

Gives very favorable results on titrations with Mayer's reagent. My own results for titrations in dilutions for 1 in 200, 1 in 400 and 1 in 600 showed an equivalent somewhat smaller than that found by Lyons; but on the whole I prefer to accept the results of his work,[1] and the following table is constructed on his equivalents:

Fluid measures, 40 cc.[2] at the beginning of the titration, and contains 6 cc. of 1 per cent. by vol., sulphuric acid.

Cc. required.	Dilution.	Equivalent.
3·06	1 in 600	0·0218
3·36	1 in 500	0·0238*
3·57	1 in 450	0·0249*
3·89	1 in 400	0·0257
4·43	1 in 350	0·0258*
5·13	1 in 300	0·0260*
6·11	1 in 250	0·0262*
7 6	1 in 200	0·0263

BRUCINE.

Titrations of this alkaloid are far from satisfactory. Results are apt to vary widely, and on comparatively little provocation. When a series of equivalents were obtained which agreed among themselves the following were the figures:

1 in 200..... ·01059
1 in 300..... ·01025
1 in 400..... ·01016

It will be seen that these figures differ quite materially from those of previous experimenters, and it is scarcely worth the trouble to calcu-

[1] For 1 in 200, 1 in 400, and 1 in 600, I found 1 cc. of the reagent to precipitate, respectively, 0·0257, 0.0218 and 0·0186 of alkaloid. I believed at the time that my alkaloid was not quite pure, and in this case the presence of small amounts of hydrastine would lower the equivalent considerably, as 1 cc. of the reagent will precipitate of this alkaloid only 0·0101. With an alkaloid giving as good results as berberine is reported and seems to give, it is likely that the highest equivalent obtained would be the most nearly correct.

[2] In applying Mayer's agent to hydrastis probably a dilution of 20 cc., representing 2½ grammes of drug, would be better than 40 cc.; but in this case titration give at best only a rough idea of the value of the drug, and can hardly be regarded as having comparative value, owing to the wide difference between the titration equivalents of hydrastine and berberine. Here we must be content to state results as "so many" cc. of reagent to each gramme of drug, or cc. of fluid extract.

late a table for the correction of the results of titration, as probably the alkaloid will never be estimated by this means.

Strychnine and brucine in mixture with the two alkaloids in mixtures varying from 60 per cent. to 35 per cent. of strychnine, and in solutions containing 1 part in 200 of the mixed alkaloid, the average equivalent of four experiments was found to be ·0095. For rough comparisons of samples of nux vomica this equivalent might be used, but ordinarily it is best to estimate the alkaloids by their weight.

EMETINE.

The equivalents of this alkaloid in different degrees of dilution were presented before this association at its last meeting.[1] Detailed comment is unnecessary here as it was given last year by myself, and has been considered thoroughly by others in different places. The tables to follow were the same as those which I have already given, but are now offered in greater detail.

Observation shows that with the presence of only small amounts of free acid 1 cc. of the reagent in different degrees of dilution precipitates as follows:

1 in 200	·0109
1 in 300	·0105
1 in 400	·0102
1 in 500	·0100
1 in 600	·0095

The precipitate from 0·100 of alkaloid weighs on an average 0·245 grammes, corresponding to 40·81 per cent. alkaloid.

Fluid measures 30 cc.[2] at the beginning of the titration, and contains 3cc. of 1 per cent. by vol. sulphuric acid.

Cc. Reagent Required.	Dilution.	Equivalent.
6·00	1 in 500	·0100
6·60	1 in 450	·0101*
7·35	1 in 400	·0102
8·32	1 in 350	·0103*
9·52	1 in 300	·0105
11·21	1 in 250	·0107*
13·76	1 in 200	·0109

[1] Proc. M. S. P. A., 1887, p. 93, et seq.; also in *Pharm. Era* i. 400. et seq.

[2] This dilution is suited to 2½ grammes of drug, or 5 cc. of fluid extract (or about ¾ grammes of solid extract).

These equivalents are not very different from those given by Dr. Lyons, and it is not a matter of very great consequence which are used.

GELSEMINE.

My own experience though limited confirms previous unfavorable reports on estimations of this alkaloid by means of Mayer's reagent. The end reaction is far from being distinct or satisfactory. I have only made one series of titrations on known material and though results agreed among themselves fairly well they differ from previous published statements. This is not to be surprised at, for in addition to general unsatisfactory results it may also be said that the commercial alkaloid is most likely a very variable product. However I have allowed my results to stand as they were obtained. It has been pointed out that phosphomolybdic acid will most likely supercede in the estimations of this alkaloid.[1] A table however is given for corrections, etc., based on the observation that in slightly acid solutions 1 cc. of the reagent precipitates—

1 in 200.....0·0109
1 in 400.....0·0090
1 in 600.....0·0078

The precipitates when collected, immediately washed, dried and weighed, average about 0·205 grammes of alkaloid equal to approximately 49 per cent. alkaloid.

Fluid measures 15 cc.[2]

Cc. Required.	Dilution.	Equivalent.
3·20	1 in 600	·0078*
3·57	1 in 500	·0084
4·17	1 in 400	·0090*
4·55	1 in 350	·0094
5·10	1 in 300	·0098
5·77	1 in 250	·0104
6·88	1 in 200	·0109*

HYDRASTINE.

The end reaction with this alkaloid is not very distinct but by using care in noting its end, as already indicated, duplicate titrations may

[1] Paper read by the writer before the American Phar. Assoc., Sept., 1888.

[2] Probably best suited as a representative of 25 cc. of fluid extract or an equivalent of drug.

be made to agree quite closely. The titrations were all made in a solution containing one-tenth per cent. by volume of sulphuric acid and four determinations made for one part in 200 but only two for one part in 500 which agreeing closely gave averages respectively of 0·0101 and 0·0076.

These equivalents are considerably lower than those offered by Lyons, which may perhaps be accounted for by the difference of acidity in the solutions titrated. In the case of my own I can specify the exact amount of acid used, and in titrations where this can be accurately controlled the equivalents I think can be relied on.

If this acidity is not under control I should be inclined to doubt the results of titrations. The mere fact that two observers working independently with an alkaloid like hydrastine should obtain such widely discrepant results shows that slight variations in the conditions will affect the results. The acidity seems to be the point on which we must have differed. As already stated, my titrations were made in solutions containing one per cent. sulphuric acid. The four determinations made for one in 200 showed respectively, ·0100, ·0100, ·0101 and ·0102 while for one in 500 the titration resulted in ·0077 and ·0075.

The precipitates from 0·100 grammes of alkaloid when collected immediately dried and weighed averaged 0·206 grammes, corresponding to 48½ per cent. alkaloid.

Ordinarily it cannot be said to be safe to determine two equivalents so widely separated as these dilutions were, and then interpolate intermediate equivalents for reasons which will be readily understood by noting the equivalents for aconitine or berberine. In the case of hydrastine however it seems permissible and consequently it has been followed in the table.

Fluid measures 20 cc., and contains 2 cc., of 1 per cent. by volume sulphuric acid.

Cc. required.	Dilution.	Equivalent.
5·26	1 in 500	·0076*
5·81	1 in 400	·0086
6·35	1 in 350	·0090
7·09	1 in 300	·0094
8·16	1 in 250	·0098
9·90	1 in 200	·0101*

SANGUINARINE.

Dragendorff on the results of some experiments of Masing hazards a guess that the titration equivalent of sanguinarine will be found to be ·00743. Calculation shows that this is a theoretical equivalent based on Flückiger's formula for the alkaloid (C_{17} H_{15} NO_4=297, $\frac{1}{40}$ of 297=·00743), and assuming C_{17} H_{15} NO_4 HI. HgI_2 to be the composition of the precipitate. My own results are widely at variance with this figure. A number of titrations have been performed, of which the following are averages:

1 in 200	·0183
1 in 300	·0178
1 in 400	·0173
1 in 500	·0165
1 in 600	·0155

Duplicates show some differences even when the conditions seem the same. The end reaction, however, is sharp and well defined, and approaches closely to berberine and strychnine in this respect. Like these alkaloids, also, the excess of reagent required to precipitate the alkaloid is small, at least in the stronger solutions, and, on the whole, the alkaloid may be ranked with those giving good results in titrations. Just what the action of its associated alkaloid chelidonine is I cannot say, though it would be very interesting to know. 0·100 grammes of alkaloid yield a precipitate weighing from 0·180 to 0·206, with an average of 0·194, corresponding to 51·5 per cent. average of alkaloid in the precipitate.

Fluid measures, 30 cc. at the beginning of the titration, and contains 3 cc. of 1 per cent. by vol. sulphuric acid.

Cc. reagent.	Dilution.	Equivalent.
3·64	1 in 500	·0165*
3·94	1 in 450	·0169
4·34	1 in 400	·0173*
4·89	1 in 350	·0176
5·62	1 in 300	·0178*
6·63	1 in 250	·0181
8·19	1 in 200	·0183*

STRYCHNINE.

My own experiments agree substantially with those of previous observers. For dilutions running from 1 in 200 to 1 in 400 but little

variation is noticeable, and even up to 1 in 600 no correction seems called for. In a dilution beween 1 in 200 and 1 in 400 the equivalent may be regarded as being ·0088 to ·0090. The average weight of precipitate is 0·265 from 0·100 of alkaloid, equal to 37·7 per cent. alkaloid in the precipitate.

Strychnine and Brucine in mixture. See Brucine.

CATECHU AND GAMBIER.[1]

By Henry Trimble.

Query No. 27.—"The U. S. P. denotes as catechu the extract of Acacia Catechu; the Br. P. uses the extract of Uncaria Gambier. Which of these two is to be preferred?"

The extract of Acacia Catechu is known in commerce as *cutch*, and that from Uncaria Gambier as *gambier;* the former of these terms, therefore, will be used to indicate that officinal in the U. S. P., and the latter that of the Br. P. Catechu is a term applicable to either or both.

Considerable difficulty was experienced in finding gambier among the wholesale druggists, and such synonyms as "pale cutch" and "terra japonica" were tried, but either ordinary cutch was sent, or I was told they did not keep it.

It must be borne in mind that cutch is not imported primarily for use in medicine, but is brought in by hundreds of tons for the use of dyers. Gambier comes in cubes or masses of indistinct cubes, in equal if not larger amounts than cutch, for the use of both dyers and tanners. Their prices are about the same, ranging from five to eight cents per pound. All authorities agree that the medicinal use of these two remedies is for their astringent and very slight tonic properties; therefore, preference should be given to the one which possesses the greatest astringency.

A chemical examination of representative samples as found in our market, was apparently the only method of solving the problem, therefore the results of the examination of three samples

[1]Read before the American Pharmaceutical Association at Detroit, and communicated by the author.

of each will be given as a basis, although a number of others were partly examined in studying adulterations and searching for catechin.

No. 1. Cutch "S. M." brand, in good repute in U. S.

No. 2. Cutch, "M. M." brand, in good repute in England, and given me by a Bradford dyer.

No. 3. Cutch, brand not known, purchased of a wholesale drug firm in Philadelphia.

No. 4. Gambier, in masses, from a wholesale drug firm of Philadelphia.

No. 5. Gambier, in cubes, dark, direct from importer.

No. 6. Gambier, in cubes, light, direct from importer.

One gram of each was powdered and extracted in a Tollens apparatus, successively with boiling stronger ether and boiling absolute alcohol. The residue was percolated with cold distilled water as long as anything dissolved. The following is a summary of results in per cent.

Sample No.....	1.	2.	3.	4.	5.	6.
Soluble in stronger Ether....	33·30	33·65	25·60	45·59	36·45	40·20
Soluble in Absolute Alcohol.	22·08	22·63	31·78	26·80	32·28	28·25
Total by Ether and Alcohol.	55·38	56·28	57·38	72·39	68·73	68·45
Soluble in Water.....	27·40	29·01	20·50	10·13	15·20	16·05
Total Solubility	82·78	85·29	77·88	82·52	83·93	84·50

It is usually stated in the books that the important constituents of these two drugs are catechin, soluble in ether, and catechu-tannic acid, soluble in water and alcohol, but insoluble in ether. If this be true, we would have a very ready method of determining the value of a sample; for, by simply adding those portions soluble in ether and alcohol, we would have the total available portion. That soluble in water after the above treatment, and so given in the chart, is mucilage with a part of the inorganic constituents, and forms no part of the most important pharmaceutical preparation—the tincture.

The sum by the first two solvents very closely indicates that which would be dissolved in making the tincture, but as will be shown it does not indicate the astringent value of the samples. A more accurate method for estimating the catechin, is to extract it by agitating the

aqueous solution with ether. By this process the following percentages were obtained:

Sample No. 1.	2·80.	Sample No. 4.	12·64.
Sample No. 2.	1·70.	Sample No. 5.	7·76.
Sample No. 3.	10·70.	Sample No. 6.	19·76.

The aqueous residue from the agitation was warmed to expel ether, and treated in some cases with gelatin and alum, in others with gelatin and ammonium chloride, to separate tannin. The results in all cases were low and unreliable.

Portions of the original samples were then treated with "hide powder," according to the method of Simand and Weiss (*Dingler's Polyt. Jour.*, 260, 564), and the results for tannin gotten, which, while not entirely satisfactory, are undoubtedly the best to be obtained with our present knowledge. The following are the percentages of tannin:

No. 1.	31·94.	No. 4.	33·34.
No. 2.	33·54.	No. 5.	47·18.
No. 3.	25.50.	No. 6.	45·90.

By adding to these figures the amount of catechin, we get the total available value, and by then adding the mucilage, ash and moisture, and subtracting from 100, we find the per cent. of inert constituents.

	Cutch.			Gambier.		
Samples No.....	1.	2.	3.	4.	5.	6.
Catechin.....	2·80	1·70	10·70	12·64	7·76	19·76
Catechu-tannic Acid.....	31·94	33·54	25·50	33·34	47 18	45·90
Total Valuable Constituents..	34·74	35·24	36·20	45·98	54·94	65·66
Mucilage.....	27·40	29·01	20·50	10·13	15·20	16·05
Ash.....	2·29	2·27	2·10	4·74	3·37	3·50
Moisture.....	12·50	12·20	15·36	10·33	11·03	9·90
Coloring and other Inert Matter.....	23·07	21·28	25·84	28·82	15·46	4·89
	100·00	100.00	100·00	100·00	100·00	100 00

Dr. A. Lehmann (Dissertation, Dorpat, 1880), examined a large number of samples of cutch and gambier, and found the catechin to vary from 13·8 to 33·8 per cent., and the catechu-tannic acid from 22·6 to 50·8 per cent. He was evidently able to procure better samples than the average that come to this country, although the results

given in the above chart indicate the absence of intentional adulteration.

It has long been a statement in the text books that cutch and gambier are identical in chemical composition. It has, however, never been proven, and I am convinced that it is entirely erroneous. In the above samples no crystallized catechin could be obtained from samples 1 and 2, and only a small quantity from 3, while it readily crystallized from the aqueous solution of the ethereal extract of gambier. Both the physical appearance and the analysis indicate that there are important differences in the coloring matter of the two. This is further emphasized when we consider their respective commercial uses. The tanner selects gambier for his purpose because he wishes tanning material without color; the dyer prefers cutch, because he wants coloring matter as well as tannin, the color in some cases being the more important of the two. From the published accounts of the methods of preparing these two drugs, it is impossible to believe they could be chemically identical.

Apart from their different botanical origin, the long continued heating necessary to extract cutch from the hard heart wood, is so different from that required to exhaust the more porous twigs and leaves of the gambier, that the evaporation in the case of the cutch is carried directly to dryness, the decomposition products being such as to prevent the "setting" of the mass as it does in the case of the gambier.

In the latter the concentration of the liquor is stopped when it reaches the consistency of syrup, and the liquid by stirring and cooling "sets" on account of separation of catechin, becoming of such solidity that it can be cut into blocks, and further dried at such a low temperature that comparatively little change takes place. When gambier comes in cubes it precludes a kind of adulteration which is extensively carried on with cutch, namely the admixture of small stones, pieces of earthenware and bricks.

Such adulteration is liable to be overlooked in selecting samples for analysis, and is best indicated when a large lot is powdered and portions of this analyzed.

Two samples of powdered cutch were examined and yielded 14·01 and 18·20 per cent. of ash, which was made up of sand and crushed stones. These samples had been further reduced in value by the heat necessary to dry them previous to powdering, as is indicated by the

following percentage results obtained by treatment with ether and alcohol:

Samples No.	7.	8.
Soluble in ether	0·90	8·75
Soluble in absolute alcohol	9·93	17·50
Total valuable constituents	10.83	26·25
Mucilage, etc	47·30	29·10
Ash	14·01	18·20
Moisture	14·10	7·30
Insoluble	13·76	19·15
	100·00	100·00

Gambier in cubes could not be so adulterated, and it is so dry as to be readily powdered in a mortar without previous heating to expel moisture. It is stated that gambier is adulterated by the addition of clay, but this admixture is probably not more common than it is with cutch; in both it may be detected by the amount of residue left on burning.

Another important point is to be observed in regard to cutch; there are on the market for the use of dyers, several preparations under the name of "patent cutch," "purified cutch," etc., made by dissolving the commercial article in warm water, evaporating this aqueous solution, and adding some mordant, often potassium bichromate, to develop the color for the dyer.

These preparations are liable to creep into the drug market, and if used in medicine do much harm. Such accidents would be impossible if cube gambier alone were used. British writers are singularly reticent about their reasons for preferring gambier, but it is probably in view of facts similar to those above given. The Edinburgh Pharmacopœia, about 1840, was the first to give the option of using the extract of Uncaria Gambier, as well as that of Acacia Catechu. When in 1864, the three British Pharmacopœias were incorporated under one name, both were retained under the distinct titles of "Catechu Pallidum," and "Catechu Nigrum," but in 1874 the latter was abandoned. The only English criticism I have been able to find on this change is by Mr. Peter Squire (Companion to British Pharmacopœia, 10th edition, page 85), who states that the black is the one adopted by other Pharmacopœias, and is preferred in the arts and manufactures. It is well known "to be by far superior to the pale in

astringency, and always to be had of good quality; it is therefore a matter of surprise and regret that it has been rejected from the British Pharmacopœia."

Notwithstanding this adverse opinion, which appears to be only an opinion, if the committee on revision of the U. S. P. will make the change to gambier in cubes, and include in addition to the requirements of the Br. P., that it shall not yield over 5 per cent. of ash, I believe it would be preferable for the following reasons:

1. Gambier has more available astringency.
2. If in cubes it cannot be so easily adulterated.
3. Being more carefully dried it is more easily powdered than cutch, and without the further application of heat.
4. The cubes are more uniform in composition, and are not liable to contain mordants added for the use of dyers.

NOTE ON STAR ANISE.

By E. M. Holmes, F. L. S., Curator of the Museum of the Pharmaceutical Society of Great Britain.

The recent publication of a description and figure of the true star anise plant in the *Botanical Magazine*, by Sir Joseph Hooker, affords an opportunity of adding to the notes on this subject which appeared in a previous volume of the *Pharmaceutical Journal* ([3], vol. xi. page 489. See also Am. Jour. Phar. 1881, pages 335 and 412).

In December, 1880, notwithstanding the publication of *I. anisatum* as the botanical source of star anise in Bentley and Trimen's "Medicinal Plants," Dr. Bretschneider, then medical officer to the Russian Embassy at Peking, in "Notes on some Botanical Questions connected with the Export Trade of China," states "the plant which produces this article is still unknown to botanists," and he then goes on to remark, "The first authentic information concerning the actual habitat of the star anise tree was furnished by Mr. Piry, in his 'Report on the Trade in the Port of Pakhoo' for the years 1878–1879, in which star anise is said to be brought for exportation to Kin-chow and Pakhoi from the province of Kuangsi, two districts in that province producing the article, Lung-chow on the borders of Annam and the country about Po-se on the West River, close to Yunnan."

Dr. Bretschneider adds a translation from the well-known work on

Chinese materia medica and natural history "Pen t'sao kang mu," vol. xxvi., fol. 62, in which it is stated that star anise grows in the mountains near the Tso-kiang and Yu-kiang (rivers), and that the kind most valued in China grows in Kuangsi and Kuangtung and in Annan. Dr. Bretschneider remarked that both the above rivers are in Western Kuangsi, the first being a tributary of the West River. The city of Po-se mentioned by Mr. Piry is situated on it. The Tso-kiang is a southern tributary of the Yu-kiang. These notes appear to have attracted the attention of the late Dr. Hance, who in October, 1881, forwarded seeds of the true plant received from Pakhoi to Kew.

In the same year fruit and fragments of the leaves were forwarded by Mr. C. Ford from the Hong Kong Botanical Gardens to Kew.[1] A few seedlings of the plant obtained by Mr. Kopsch, Commissioner of the Chinese Imperial Maritime Customs at Pakhoi, were grown in the Hong Kong Gardens and flowered in November, 1886, when the plants had attained a height of nine feet. Some seedlings sent by Mr. Ford to Kew in 1883 flowered at Kew in 1887, and from these the excellent plate given in the *Botanical Magazine* was drawn.

Sir Joseph Hooker points out that the plant must be placed in quite a different section of the genus from that to which *I. anisatum*, L., belongs, since it has broad obtuse perianth segments, and the peduncles are not bracteate at the base. He describes it as a new and hitherto undescribed species, as follows:—

"*Illicium verum*, Hook. f. (*Bot. Mag.*, t. 7005, July, 1888.)—*Illicium verum:* foliis elliptico-lanceolatis v. oblanceolatis obtusis v. obtuse acuminatis in petiolum brevem angustatis floribus axillaribus breviter pedunculatis globosis, perianthii foliolis ad 10 orbiculatis concavis coriaceis exterioribus majoribus ciliolatis intimis rubris staminibus ad 10 brevibus, filamento cum connectivo, in corpus carnosum subovoidem confluente, loculis adnatis parallelis subremotis oblongis, carpellis ad 8 stigmatibus brevibus vix recurvis carpellis maturis ad 8 cymbiformibus longiuscule rostratis.

"*I. anisatum*, 'Gært. Carp.,' vol. i., page 338, t. 69 (Non Linn)."

The leading features in the plant appear to be the solitary axillary globular flowers, which do not expand fully, the segments remaining convex, the inner segments being red, and the ten stamens, in which the filament forms with the connective an ovoid body. The peduncles

[1] *Bot. Magazine*, t. 7005.

are curved and barely half an inch in length. It may be here remarked that a very similar plant, but with smaller and yellowish flowers, has been grown at the Botanical Gardens at Regents Park for the last eighteen years under the name of *I. anisatum*, but the leaves of this species have a sassafras taste. They differ from those of *I. religiosum* in having the midrib prominent below and depressed on the upper surface of the leaf, while in *I. religiosum* the midrib is prominent on the upper and not on the lower surface, and the taste is astringent and terebinthinous.—*Phar. Jour. and Trans.*, August 11, page 101.

SHELLAC.[1]

By R. Benedikt and E. Ehrlich.

When shellac, previously freed from fat by boiling with sodium carbonate, is boiled with caustic alkalis for two hours, and the cold solution acidified with sulphuric acid, about 70 per cent. of a viscous, liquid shellac is precipitated. The product is extracted with ether, and purified by means of the magnesium salt ($C_{46}H_{70}Mg_2O_{13}$). It is a thick, viscous liquid, which becomes mobile when heated, and is only very sparingly soluble in boiling water, but dissolves readily in alcohol and ether. The alcoholic solution is precipitated by water. When heated, water is evolved and on cooling a solid mass very similar to ordinary shellac is obtained. The acid value of liquid shellac is nearly three times as great as that of ordinary shellac, 1 gram requiring 0·204 gram of potash for complete saturation. From this datum and from the elementary analysis, the formula of liquid shellac is probably $C_{46}H_{72}O_{12}$. A mixture of ordinary and liquid shellac is obtained by boiling two portions of shellac, one with sodium carbonate, the other with soda, separating the wax and acidifying the cold mixed solutions with acetic acid. It is a plastic resin which when free from acid retains its plastic condition for a considerable time, but after several months gradually begins to harden at the surface. The alkaline-earth salts of liquid shellac are soluble in cold water in all proportions, they are precipitated as thick liquids when the solution is boiled, but redissolve completely on cooling. When an aqueous solution is evaporated over sulphuric acid, a completely transparent residue is obtained, which after some time becomes opaque. These salts are very brittle,

[1] *Monatsh.*, ix., 157—164; *Jour. Chem. Soc.*, 1888, 846.

and even in the dry state are very readily soluble in cold water. The *barium* salt is obtained by neutralizing an alcoholic solution with baryta-water. A solution of the magnesium salt gives with lead, silver, and zinc salts white precipitates which form resinous masses when warmed.

Shellac freed from wax yields 20 per cent. of azelaïc acid when boiled with potash and potassium permanganate, products smelling like butyric acid being also formed. Shellac is completely converted into azelaïc acid and fatty acids by potassium permanganate, when the residual resin is again boiled with the permanganate, and the process repeated until the whole is oxidized.

MODE OF FORMATION OF GUMS AND GUM-RESINS.

Although these two classes of substances differ, as a general rule, in their mode of formation—the former being the result of chemical changes in the cell-wall, the latter a secretion in the interior of cells—this is not altogether without exception. In some species of *Orchis* true gum or mucilage is secreted in the interior of cells. Intercellular passages or canals are known as "schizogenous," when they result from the simple separation or parting of cells, "lysigenous" when they are formed by the absorption or disappearance of cells or cell-walls. Essential oils and gum-resins are generally formed in a layer of so-called "epithelial" cells lining the cavity or receptacle, which may be either of schizogenous or lysigenous origin, and into which they are diffused through the very thin cell-walls of the epithelial cells. There are, on the other hand, instances in which the cell-wall takes part in the formation of essential oils and resins, as in the lysigenous oil-passages of the Aurantiaceæ.

In a recent paper in the *Berichte* of the German Botanical Society, Herr A. Tschirch describes the mode of formation of a number of essential oils and gum-resins. Copaiva balsam, derived from *Copaifera Langsdorffii* and *officinalis*, is not formed, as is sometimes stated, in schizogenous, but in lysigenous canals. The absorption of the cell-walls and the formation of the resin commences in the parenchyma of the wood, advancing from there to the medullary rays, the libriform and the vessels. The resin-passages in species of *Dipterocarpus*, which yield gurjun balsam, and those in *Eperna falcata*, which yield *Balsamum antharthriticum*, are formed in the same way. In *Styrax*

Benzoin also, the source of the benzoin of commerce, the resin is not formed in schizogenous, but in lysigenous canals. The formation originates in the medullary rays, advancing from there to the surrounding phloëm-parenchyma, and finally to the bast-cells and sclereïdes.

The same is, in general terms, the history of the formation of the resin in *Abies* and *Thuja*. But in the various kinds of myrrh, derived from species of *Balsamodendron* and *Boswellia*, the gum-resin is always formed in schizogenous receptacles or in true cells. In *Laurus Camphora* also, in the formation of camphor oil, actual absorption of the cell-walls could not be detected. In young branches it is contained in thin-walled cells situated in the wood near to the medullary rays. The large fissures in old wood filled with camphor are probably of lysigenous origin, like those of the wood of *Andira*, which contain "araroba," and those which contain catechu in *Acacia Catechu.*—*Phar. Jour. and Trans.*, August 11, page 108.

THE FURFURALDEHYDE COLOR REACTION.[1]

By L. v. Udranszky.

Mylius (1887) has shown that the red color produced by heating the bile acids, sugar, and sulphuric acid together, is due to the formation of furfuraldehyde from the two last-named reagents. He also showed that although of the substances he examined, the bile acids gave the test in the most marked manner, yet that there exist numerous organic substances that also give a similar reaction.

The present research is chiefly an expansion of Mylius' work. A very large number of organic substances were examined in the following way. A minute particle of the substance under investigation, or a drop of the substance if liquid, was placed in a test-tube with 1 cc. of water or alcohol, and then a drop of solution of furfuraldehyde; concentrated sulphuric acid was added carefully, and the result watched. The temperature of the mixture was not allowed to rise over 50°. As solutions of furfuraldehyde of a strength greater than 2·2 per cent. themselves give a coloration with sulphuric acid (showing an absorption-band spectroscopically at D), a solution of the strength 0·5 per cent. was used in all cases, which is a strength considerably greater than Mylius found necessary in the case of the bile acids.

[1] *Zeit. physiol. Chem.*, xii., 355—376 and 377—395. Reprinted from *Jour. Chem. Soc.*, Aug., 1888.

Some of the substances examined gave a coloration with sulphuric acid alone; the tint given with furfuraldehyde also varied a great deal; the particulars in each case are stated in a lengthy table. The reaction was found not to be a class reaction. The substances which give a color are as follows:—Acetal, acetaldehyde, ethyl acetoacetate, acetone, ethylene glycol, malic acid, alizarin, amyl nitrite, anilidoacetic acid, aniline, anisaldehyde, anthracene, anthraquinone, apomorphine, atropine, benzaldehyde, borneol, catechol, brucine, quinic acid, cholesterin, cinchonine, codeïne, coniferin, conine, cumarin, cyanuric acid, cymene, digitalin, dimethylaniline, dihydroxytartaric acid, diphenylamine, gallic acid, Japan camphor, cresol, lævulinic acid, mesitylene, mesityl oxide, metaldehyde, methyl alcohol, methylhydantoïn, methylaniline, morphine, naphthalene, *a*-naphthol, *a*-naphthascatol, œnanthaldehyde, orcinol, paraldehyde, paraffin, phenanthrene, phenanthraquinone, phenol, phenylhydrazine, phloroglucinol, phorone, propaldehyde, protocatechuic acid, pyrogallol, resorcinol, salicaldehyde, salicylic acid, scatol, stearic acid, strychnine, toluene, thymol, tyrosine, valeraldehyde, vanillin, vanillic acid, vaselin, veratrine, metaxylene, paraxylene, cinnamaldehyde.

The substances which gave no color are as follows:—Acetamide, acetanilide, acetophenone, alloxan, alloxantin, aspartic acid, benzonitril, benzoic acid, succinic acid, hydrocyanic acid, pyruvic acid, butyric acid, caffeine, caproic acid, quinine, chinoline, quinone, quinoxaline, chloral hydrate, chloroform, citric acid, crotonic acid, cyanamide, dextrin, metadinitrophenol, dinitrotoluidine, dulcitol, acetic anhydride, formamide, fumaric acid, fermentation lactic acid, glycerol, glycocine, glycollic acid, glyoxal hydrogen sulphite, uric acid, urea, hippuric acid, isatin, leucine, malic acid, maltose, mandelic acid, mannitol, methylamine, orthonaphthoxyindol, metanitraniline, orthonitrobenzaldehyde, orthonitrobenzoic acid, orthonitrophenol, orthonitrophenylpropionic acid, oxalic acid, ethyl oxalate, parabanic acid, metaphenylenediamine, phenylacetic acid, picrotoxin, picric acid, piperidine, pyridine, quinol, mucic acid, starch, tannin, tetroxyethylbenzidine, grape-sugar, tartaric acid, trimethylamine, urethane, xylidine, cinnamic acid.

The spectroscopic appearances of the colors obtained differ in many cases; in all probability the products are therefore different; particulars in the case of a few of the more important substances are given; in the case of bile there is a band between D and E, and another at

F. Several of the substances examined, for instance *a*-naphthol, give the test with greater delicacy than is the case with cholic acid.

The fact that the test is given by coniferin gave rise to a number of experiments on the color reactions produced by strips of the wood of the pine and other trees.

In conclusion, the delicacy of the reaction as applied to the detection of bile is discussed; using a 1 per cent. solution of furfuraldehyde in the manner already detailed, it is found possible to obtain a color with 0·000033 gram of cholic acid; a quantity of 0·00005 gram gives a color sufficiently intense to show its spectroscopic bands; in order to obtain evidence of the presence of bile acids in urine, it is generally necessary first to isolate them from that secretion. Normal urine does not contain bile acids.

The question whether normal urine contains carbohydrates has been one on which a large amount of work has been done, but has never been satisfactorily settled. The most recent of these observations are those of Landwehr (1886), who states that animal gum may be present in the urine, and the author's own researches on humous substances (1887). The fact that carbohydrates yield furfuraldehyde on treatment with acid, which can be identified by means of the characteristic color given with bile acid, *a*-naphthol, and many other substances, has led to the present reinvestigation of the question. The special method adopted is that of H. Schiff (*Ber.*, xx., 540), in which strips of filter-paper are dipped in a mixture of xylidine, glacial acetic acid, and alcohol, then dried. The substance suspected to contain carbohydrate is heated in a tube with sulphuric acid; the fumes, which contain furfuraldehyde, strike a red color with the strips of paper placed at the mouth of the tube. Using this method with quite small quantities (a few drops) of normal urine, the color never fails to appear. The conclusion is drawn that normal urine contains carbohydrates, although of what kind is doubtful. A reaction described by Molisch (AMER. JOUR. PHARM., 1887, p. 74), in which either thymol or *a*-naphthol and sulphuric acid give a red coloration, may also be used with the same result.

In cases of glycosuria these reactions occur more readily, and by a minutely described process of appropriate dilution of the urine, an approximate quantitative result may be obtained, at least sufficiently near to enable one to say whether the secretion contains more than a normal amount of carbohydrate.

In all such testing, the urine must be free from proteïd, as the concluding portions of the paper show that furfuraldehyde is one decomposition product of proteid; this fact is considered to be the first well-established chemical relationship between proteids and carbohydrates, although the physiological connection between the two classes of substances has long been recognized (Bernard, Seegen, &c.). It also affords an explanation of the color reactions which are caused by treating proteïd with acid, such, for example, as the Adamkiewicz reaction. The amido-acids which result from the decomposition of proteïds yield no furfuraldehyde.

DETECTION OF IMPURITIES IN COMMERCIAL ALCOHOLS.[1]

By L. Godefroy.

6 or 7 cc. of the alcohol is agitated with one drop of perfectly pure benzene, mixed with 6 or 7 cc. of pure sulphuric acid of 66°, and again agitated. If reducing "head" products are present, the liquid immediately acquires a coloration which gradually darkens for a few minutes, and varies from pale brownish-yellow to black. Pure ethyl alcohol gives no immediate coloration, but after 8 or 10 minutes the liquid acquires a slight rose tint. This test will detect 1 cc. of "head" products in 1000 litres of alcohol, or 1 part per 1,000,000. The quantity may be estimated by comparing the color with that given by alcohol containing a known quantity of acetaldehyde, and expressing the results in terms of the latter.

If the liquid remains colorless after several minutes, no "head" products are present. In order to detect "tail" products, care is taken that the acid and alcohol are thoroughly mixed, in order to avoid polymerisation, and the liquid is boiled for a short time and then allowed to remain for several minutes. Under these conditions, pure ethyl alcohol gives an ochre-yellow coloration; but in presence of "tail" products the liquid acquires a brown color with a green fluorescence, the depth of tint increasing with the quantity of impurity. This test is not so sensitive as the first, but will detect 1 part in 100,000.

Neither of these tests is directly applicable to wines, spirits, etc. These liquids should be distilled, and the first fraction tested for "head" products, and the last fraction for "tail" products.

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[1] *Compt. rend.* cvi., 1018—1020; *Jour. Chem. Soc.*, 1888, p. 875.

ABSTRACTS FROM THE FRENCH JOURNALS.

Translated for the American Journal of Pharmacy.

CRESYLIC ACID OR CRESYLOL.—According to recent studies by Dr. Henri Delplanque (*Bull. gén. de thérap.*, Aug. 15, 1888), this substance is superior to phenol as an antiseptic, while it is 75 per cent. less toxic to animals. The author's experiments were made by means of cultures of the bacilli of the principal zymotic diseases.

STERILIZATION OF MEDICINAL SOLUTIONS.—M. Gaquemaire finds that when certain saline solutions are made in carbonic acid water with a pressure of 4 or 5 atmospheres, they will remain free, for a considerable time, from the cryptogamic vegetations which pharmacists find so undesirable. To the possible objection that the constant uncorking of the bottle in dispensing permits the gas to go off, the author says that the liquid will continue to retain one volume of the gas, and, as a matter of fact, an excess of it is always found in the last dose taken from the bottle.—*Bull. gén. de thérap.*, Aug. 15, 1888.

CAMPHORATED NAPHTHOL.—M. Desequelle (*Arch. de Pharm.*, Sept. 5, 1888), finds that a mixture of β naphthol, 10 gm., and camphor 20 gm., finely pulverized, has identical properties with camphorated phenol. The product is a colorless syrupy liquid, insoluble in water, and miscible in all proportions with fixed oils. Its antiseptic properties are superior to those of phenol, and—according to Prof. Bouchard's experiments—it is less toxic. Does it hold its antiseptic properties? If so, this mixture should, for surgical uses replace the phenol compound.

CONSTANTIN PAUL'S SACCHARIN LIQUOR is said to have been adopted by several of the Paris pharmacists. The formula is: Saccharin, 6 gm.; bicarb. soda, 4 gm.; alcohol at 40°, 100 gm.; ol. menth., 20 drops; a teaspoonful represents 25 cgm. of saccharin—sufficient to sweeten a tumbler of water. (See also *Elixir Saccharini*, page 516.

APPLICATION FOR PEDICULI PUBIS.—The following formula, originally published in the *Pratique méd.*, is recommended in the French journals, to replace mercury ointments for the above purpose: Petroleum, 15 gm.; balsam of Peru, 15 gm.; oil of laurel, 1 gm.

AN ARTIFICIAL GUM ARABIC, says the *Revue scientifique*, may be made by boiling 20 parts of sugar with 7 parts of fresh milk, adding

50 parts of a solution of 36 parts of silicate of soda in 100 parts of water, and heating to 50°C. (122° F.). The mass is then poured into tin receptacles and granulated masses resembling gum arabic, deposit by degrees. (See also August number, p. 406).

ALCOHOL MIXTURES ARE DANGEROUS to use in the middle ear in cases where suppuration is present. The cause of trouble is said to be (*Boll. d. mol. del orecchio*) the consequent dehydration of the healthy tissues of the neighboring parts.—*Monit. thérap.*

ALKALOIDS OF COD LIVER OIL.—Gautier and Mourgues have separated a number of these, about one-half of which are fixed bases. They found butylamine, amylamine and hexylamine, together with three new bases, hydrolutidine, aselline and morhuine. They found also, a small quantity of lecithine and a crystallizable azotic acid which they call gaduinic acid. "It is at once," say the authors, "a quite powerful acid, and an alkaloid capable of giving crystallizable chloroplatinates."—*Union méd.*, July 21, 1888.

CHARDON MARIE, OR SEMEN CARDUI MARIÆ.—In a long study of visceral varices (*Bull. gén. de Thérap.*, June 15, 1888), Dr. A. Tripier claims to have had remarkable success with this drug in the treatment of abdominal varix, hemorrhoids, certain cases of urethral and uterine engorgement, and other forms dependent upon conditions of local congestion with painful tension. The treatment was adopted from indications given by Rademacher, followed by Worms, who used a decoction made from the seeds. Tripier uses a tincture (made from the seeds), in doses of 20 drops in a tumbler of water, night and morning.

TO RENDER SANTONIN VERY ACTIVE.—Santonin does not dissolve freely in ordinary alcohol, ether, or the fixed oils. Complete solution is obtained by treating as follows: Crystallized santonin, 1 gm.; strong alcohol, 120 gm.; ol. ricini, 240 gm. Dissolve the santonin in the alcohol, mix with the oil, and remove 80 gm. of the alcohol by distillation. The product is a very clear and active preparation, which Dr. Bayon (*Monit thérap.*, Aug. 6, 1888), claims to have long administered with the best results.

HYDROQUINONE is said to act best in moderate doses (30 to 50 cgm. for an adult), as it sometimes produces gastro-intestinal troubles, which obstruct its action. It acts rapidly in ileo-typhus, acute rheu-

matism and erysipelas, and is an antiseptic and an anti-ferment. It lowers both the pulse and the temperature, and acts upon the respiration and the arterial pressure; it also causes diuresis and diaphoresis. —*Med. ch. Rund.; Nouv. Rem.*, Aug. 8, 1888.

COMPOSITION FILLING FOR RUBBER GOODS.—The *Revue scientifique* says that laboratory articles of rubber may be repaired by filling the cracks or torn places with a preparation composed of 16 parts of sulphide of carbon; 2 of gutta percha; 4 of india rubber, and 1 of fish glue. Open places are filled by applying successive layers with a brush. Cut or broken places are filled up and the edges held together with a moderately tightened thread, which may be withdrawn in a day or two, when any projecting substance may be removed with a sharp knife.

LANESIN is a product analogous to lanolin, for which a patent has been obtained in Germany. The bleaching waters from wool are treated with lime, and the product with alkalies. The dried product is then treated with "appropriate solvents" which are evaporated, when the residuum is treated with the ethylic and methylic ethers of oleic or ricinic acid. A soft, smooth product is obtained which does not become rancid, and is "applicable to pharmaceutic and cosmetic uses."—*Arch. de ph.*, September 5, 1888.

OLEUM CINEREUM, OR "GRAY OIL," is recommended by Dr. Raugé (*Bull. méd.*, August 8, 1888), for hypodermic injections in syphilis. It is made of one part each of mercury and lanolin, to which 4 parts of olive oil is added.—See also AMER. JOUR. PHAR., 1887, p. 294.

MERCURY IN THE URINE.—The urine is acidulated with hydrochloric acid, heated to 60° C. [140 F.], and allowed to cool, when it is again heated. A metallic strip composed of zinc and copper is plunged into the liquid at intervals, and upon this the mercury is deposited. After cooling and washing, the strip is exposed to the vapor of iodine which forms, with the deposit, iodide and biniodide of mercury.—*Jour. pharmacol.*, Brussels; *Arch. de phar.*, September 5, 1888.

BINIODIDE OF MERCURY PULVERIZATIONS FOR TUBERCULOSIS.—Miquel and Rueff's formula is given by the *Arch. de Phar.*, Sept. 5, 1888, as follows: Biniodide of mercury and iodide of potassium, of each 1 gm.; distilled water, 1000 gm. The solution is stable. At the

beginning, 10 ccm. is sprayed once daily, to be increased to 25 ccm. twice daily. The larger portion of the liquid should be inspired. It reaches the lungs, say the authors, but salivation does not follow, even after months of treatment. The sputa changes in character and diminishes in quantity; the number of microbes is lessened, but these organisms rarely dissappear completely. The cough increases at first, and afterwards subsides.

GLEANINGS FROM THE GERMAN JOURNALS.

By Frank X. Mœrk, Ph.G.

Naphthol, lately used as a preservative for foods, can be detected by extraction with ether, allowing to evaporate and dissolving residue in hot water; the solution is first rendered *faintly alkaline* with ammonia, then *faintly acid* with nitric acid after which a drop of fuming nitric acid or of a nitrite solution is added, when a rose-red color indicates *naphthol.*—Beebe (*Ann. Chem.*) *Rdsch.*, 1888, 623.

Citric acid has been found by T. Henkel (*Chem. Centralbl.*) to be present in cow's milk in quantity varying from 0·9 to 1·1 gm. per liter. The concretions frequently found in condensed milk consist of almost pure calcium citrate. Woman's milk contains no citric acid.—*Ztschr. f. Nahrungsm. Unters.*, 1888, 135.

Piperine estimations.—50 gm. pepper are extracted with methyl alcohol, after the evaporation of the solvent the residue is treated with a cold solution of potassium carbonate which dissolves the resinous substances leaving the piperine; this is washed with water, recrystallized from alcohol, dried at 100° and weighed. From the alkaline solution the resin can be precipitated by hydrochloric acid. The specimens contained approximately 14 per cent. moisture; the figures relate to dry material:

	Piperine.	Resin.
Black pepper,	7·14 per cent.	1·44 per cent.
" " (Trang.)	6·62 "	0·82 "
White "	6·47 "	0·69 "
Long "	4·24 "	1·16 "

T. Stevenson (*Analyst*) *Ztschr. f. Nahrungsm. Unters.*, 1888, 135.

Iodoformium bituminosum is made by incorporating iodoform with tar in such a manner that an almost odorless preparation results; the process remains a secret. In larger quantities the odor of tar is per-

ceptible; if the preparation is mixed with a large quantity of water the iodoform odor becomes prominent.—*Rdsch.*, 1888, 640.

Test for Glycerin.—The property of glycerin to displace boric acid in borax is used in the following manner: The solution to be tested and a solution of borax are slightly colored by addition of a few drops of litmus solution and the two blue liquids mixed; in presence of glycerin the liquid is reddened, owing to the liberation of boric acid. The red color on heating becomes blue, but, on cooling, reappears.—*Pharm. Post*, 1888, 487.

Ferrum Peptonatum.—75·0 fresh egg albumen (10·0 dried) are dissolved in 1000·0 distilled water; to this is added 18·0 hydrochloric acid and 0·5 pepsin, and digested at 40° until a portion produces only a faint turbidity with nitric acid; allow to cool, neutralize with soda solution, strain and mix the liquid with 120.0 solution of oxychloride of iron and 1000·0 distilled water. The fluid is now *exactly* neutralized with diluted soda solution, and the precipitate washed by decantation with distilled water until the washings produce no turbidity with silver nitrate. The precipitate is collected on a wet linen strainer, drained, placed in a porcelain capsule, 1·5 hydrochloric acid added and heated, with stirring, on a water-bath until a clear solution results, which is concentrated, spread upon glass plates and dried at 20° to 30°, to yield a scale preparation, or from which is made

Liquor Ferri Peptonati by diluting with distilled water to 900·0 and adding 100·0 spirit of cognac.

The so-called "Indifferent Iron-preparations," to which class the above belongs, are very sensitive towards carbonic acid and sodium chloride, and in their manufacture it is essential to work as rapidly as possible, and to use distilled water, which has been heated, to expel CO_2 and again allowed to cool.—E. Dieterich, *Pharm. Centrlh.*, 1888, 316.

Peptone is pronounced by Palm (*Ztschr. f. An. Chem.*) to be a solution of albumen in acids. The action of lactic acid upon various albumens is to form peptone. This is also produced by the action of the same acid upon glue, chondrin and fibrin. By adding ether to an alcoholic peptone solution, a peptone of constant composition is separated as an oily mass, which contains the lactic acid and protein in stoechiometrical proportions. Albumen may be reprecipitated from peptone solutions by neutralizing the acid and adding 95 per cent. alcohol; alcohol acidulated with sulphuric acid will likewise precipitate the albu-

men, if too much acid be not present. The non-coagulation of the peptone is due to the solubility of coagulated albumen in lactic acid; but on first neutralizing with ammonia boiling will coagulate peptone solutions. The explanation of the same composition of albumen and peptone is found in the fact that in the so-called purification of the peptone the albumen was always reobtained. Peptone will reduce Fehling's solution, which is of importance in milk analysis.

A distinctive test is the addition of potassium xanthogenate; with albumen solutions, a precipitate is only obtained on addition of acid, while peptone solutions, being acid, give a precipitate at once.—*Pharm. Centrlh.*, 1888, 395.

Tasteless Quinine Tannate is made as follows: Quinine sulphate 40 parts is dissolved in distilled water 1200 parts with aid of the least possible quantity of dilute sulphuric acid, filtered and, with continued stirring, a solution of 80 parts tannic acid in 560 parts distilled water added. After standing 24 hours, filter and wash the precipitate with 400 parts distilled water; by slight pressure remove the excess of water from the precipitate and heat with 200 parts distilled water until it fuses to a transparent yellowish resinous mass which, after cooling, is powdered.—(Hung. Pharmacop.) *Rdsch.*, 1888, 621.

Chelidonine has been studied by Dr. A. Henschke, who obtained 0·29 per cent. from the root of *Chelidonium majus*. The formula for the crystallized alkaloid is $C_{20}H_{19}NO_5+H_2O$; after drying at 100° it melts at 135°. It is a tertiary base; with alkaline potassium permanganate, the oxidation products are CO_2, $H_2C_2O_4$, CH_3NH_2; with acid permanganate only CO_2 and CH_3NH_2 are obtained; nitric acid gives rise to CO_2, $H_2C_2O_4$, CH_3NH_2 and a red resinous substance forming a carmine red solution on addition of KOH or NaOH.—*Arch. der Pharm.*, 1888, 624.

Cortex Frangula and *Cascara Sagrada*.—P. Schwabe on examination of the former bark finds it to contain two crystalline principles, *emodin*, identical with frangulinic acid, and *frangulin*. This latter body is a glucoside of the formula $C_{21}H_{20}O_9$, almost insoluble in water and ether, more soluble in boiling alcohol, chloroform and benzol, easily soluble in hot glacial acetic acid, melts at 228°–230° and is decomposed by alkali and acid into *emodin* $C_{15}H_{10}O_5+H_2O$, melting at 254°, and a sugar $C_6H_{12}O_5$ possibly identical with *rhamnodulcit* $C_{21}H_{20}O_9+H_2O=C_{15}H_{10}O_5+C_6H_{12}O_5$.

From an older bark 0·04 per cent. frangulin and 0·1 per cent. emo-

din were obtained; in the fresh bark neither principle could positively be detected, indicating that they were formed on aging. The bark of Rhamnus Purshiana examined was probably of the previous year's collection. It contained *emodin*, 0·05 per cent.; frangulin which possibly forms with age could not be detected.—*Arch. der Pharm.*, 1888, 569.

Fat Determination in Milk, Cream, etc.—Place 5 cc. cream or 10 cc. milk (carefully measured) into a test-glass of 50 cc. capacity graduated into $\frac{1}{10}$ cc., add 10 cc. concentrated hydrochloric acid, boil while rotating the liquid and agitate the cold dark-brown fluid with 30 cc. ether. After this separates clearly read off the volume of the ethereal layer, remove 10 cc. with a pipette, allow to flow into a tared porcelain crucible, evaporate on a water-bath, dry in an air-bath at 100° and weigh. Calculate the weight for the volume read off. This determination can be made in about 15 minutes and the results do not differ by 0·1 per cent. from those gotten by other quantitative methods.—Dr. W. Schmidt (*Ztschr. f. an. Chem.*) *Chem. Rpt.*, 1888, 221.

NEW FORMULÆ FROM THE UNOFFICIAL FORMULARY, B.P.C., 1888.

Acetum Ipecacuanhæ.

Vinegar of Ipecacuanha.

Take of—

Ipecacuanha root, in No. 20 powder	1 oz.
Acetic acid	2 fluid oz.
Distilled water, q. s.	

Macerate the powder in 1 ounce of the acid for twenty-four hours, and then pack in a percolator. Mix the remainder of the acid with 10 ounces of distilled water, and percolate with the mixture, continuing the percolation with distilled water until 1 pint* of the vinegar is obtained.

Dose: 5 to 40 minims as an expectorant.

Elixir Phosphori.

Elixir of Phosphorus.

Take of—

Comp. tinct. of phosphor.	4 fluid oz.
Glycerin	16 "

Add the tincture to the glycerin and shake well. This elixir should be preserved from the light. Each fluid drachm contains $\frac{1}{60}$ grain of phosphorus.

Dose: 15 minims to 1 fluid drachm.

Elixir Saccharini.

Elixir of Saccharin.

Take of—

Saccharin†	480 grains.
Bicarbonate of sodium	240 "
Rectified spirit	2½ fluid oz.
Distilled water, q. s.	

Rub the saccharin and bicarbonate of sodium in a mortar, with half a pint of distilled water gradually added. When dissolved, add the spirit, filter, and wash the filter with sufficient distilled water to produce 1 pint of elixir.

* 1 imperial pint—20 fluid ounces—8750 grains of water.

† Benzoyl-sulphonic-imide—a patented preparation.

Each fluid drachm contains 3 grains of saccharin.

Dose; 5 to 20 minims.

EMULSIO OLEI MORRHUÆ, II.

Emulsion of Cod Liver Oil.

Take of—

Cod liver oil	8 fluid oz.
The yolks of two eggs.	
Tragacanth, in powder	16 grains.
Elixir of saccharin	1 fl. drm.
Simple tinct. of benzoin	1 "
Spirit of chloroform	4 "
Essential oil of bitter almonds	8 minims.
Distilled water, sufficient to produce	16 fluid oz.

Measure 5 fluid oz. of the distilled water, place the tragacanth in powder in a dry mortar, and triturate with a little of the cod liver oil; then add the yolks of eggs, and stir briskly, adding water as the mixture thickens. When of a suitable consistence, add the remainder of the oil and water alternately, with constant stirring avoiding frothing. Transfer to a pint bottle, add the elixir of saccharin, tincture of benzoin, spirit of chloroform, and oil of almonds previously mixed, shake well, and add distilled water, if necessary, to make the product measure 16 fluid oz.

Dose: 2 to 8 fluid drachms.

EXTRACTUM TRITICI LIQUIDUM.

Liquid Extract of Triticum.

Take of—

Triticum rhizome, in No. 20 powder	10 oz.
Rectified spirit, Distilled water, of each, q. s.	

Moisten the powder with 4 fluid ounces of distilled water, pack in a percolator, and pour boiling distilled water upon it until it is exhausted. Evaporate the percolate to 15 fluid ounces, add to it 5 fluid ounces of rectified spirit, mix, and set aside for forty-eight hours. Then filter the liquid, and add to the filtrate enough of a mixture composed of 3 fluid parts of distilled water and one of rectified spirit to make the liquid extract measure 1 pint.

Dose: 1 to 6 fluid drachms.

LIQUOR FERRI HYPOPHOSPHITIS FORTIS.

Strong Solution of Hypophosphite of Iron.

Take of—

Sulphate of iron	760 grains.
Hypophosphite of barium (Containing not less than 95 per cent. of Ba. 2 $(PH_2O_2)H_2O$.)	830 "
Diluted sulphuric acid	100 minims.
Distilled water	1 pint.

Put the sulphate of iron with 5 fluid ounces of distilled water in a tall 24-oz. bottle, and shake till dissolved. Dissolve the hypophosphite of barium in the remaining 15 fluid ounces of distilled water, and add slowly to the former solution. Shake and add the diluted sulphuric acid; again shake and set aside for two days, then syphon off the clear liquid. Keep it in bottles quite full and in a dark place.

Each fluid drachm contains about 5 grains of hypophosphite of iron. The solution has an acid reaction, and it should not give more than a faint precipitate, if any, with either diluted sulphuric acid, or solution of chloride of barium.

Dose: 10 to 30 minims.

LIQUOR HYPOPHOSPHITUM COMPOSITUS.

Compound Solution of Hypophosphites.

Syn.—Liquor Ferri Hypophosphitis Compositus.

Take of—

Hypophos. of calcium	320 grains.
Hypophos. of sodium	320 "
Hypophos. of magnesium	160 "
Strong solution of hypophosphite of iron	6 fluid oz.
Hypophosphorous acid, 30 p. c.	½ fluid oz.
Distilled water, q. s.	

Dissolve the hypophosphites of calcium, sodium, and magnesium in 12 fluid ounces of distilled water; add the solution of hypophosphite of iron and the hypophosphorous acid. Filter, and make up to 1 pint by the addition of distilled water.

Each fluid drachm contains about 2 grains each of hypophosphite of sodium and calcium, 1 grain of hypophosphite of magnesium, and 1½ grains of hypophosphite of iron.

Dose: ½ to 2 fluid drachms.

Syrupus Codeinæ.

Syrup of Codeine.

Take of—

Codeine, in powder	20 grains.
Proof spirit	1¼ fluid oz.
Distilled water	1¼ " "

Dissolve and add

Syrup, sufficient to produce	1 pint.

Dose: ½ to 2 fluid drachms.

Syrupus Ferri Bromidi.

Syrup of Bromide of Iron.

Take of—

Iron wire, free from oxide	½ oz.
Bromine	553 grains.
Refined sugar	14 oz.
Distilled water q. s.	

Dissolve the sugar in 6 ounces of distilled water, by the heat of a water-bath. Put the iron wire with 4 ounces of distilled water into a glass flask, having a capacity of at least 1 pint, and surround it with cold water. Then add the bromine in successive quantities; shake occasionally until the froth becomes white, and the reaction is complete. Filter the solution into the warm syrup, and add, if necessary, distilled water sufficient to produce 1 pint.

Each fluid drachm contains about 4½ grains of bromide of iron.

Dose: ½ to 1 fluid drachm.

Syrupus Ferri Hypophosphitis.

Syrup of Hypophosphite of Iron.

Take of—

Strong solution of hypophosphite of iron	4 fluid oz.
Syrup	16 " "

Mix.

Each fluid drachm contains about 1 grain of hypophosphite of iron.

Dose: ½ to 2 fluid drachms.

Syrupus Ferri et Quininæ Hydrobromatum.

Syrup of the Hydrobromates of Iron and Quinine.

Syn.—Syrupus Ferri Bromidi cum Quinina.

Take of—

Acid hydrobromate of quinine	160 grains.
Diluted hydrobromic acid	1 fluid oz.
Distilled water	1 " "

Mix the diluted hydrobromic acid with the distilled water, and in the mixture dissolve the acid hydrobromate of quinine. Then add

Syrup of bromide of iron sufficient to produce	1 pint.

Each fluid drachm contains 1 grain of acid hydrobromate of quinine, and about 4 grains of bromide of iron.

Dose: ½ to 1 fluid drachm.

Syrupus Ferri Quininæ et Strychninæ Hydrobromatum.

Syrup of the Hydrobromates of Iron, Quinine, and Strychnine.

Syn.—Syrupus Ferri Bromidi cum Quinina et Strychnina.

Take of—

Strychnine, in powder	2½ grains.
Acid hydrobromate of quinine	160 "
Diluted hydrobromic acid	1 fluid oz.
Distilled water	1 "

Mix the diluted hydrobromic acid with the distilled water, and in the

mixture dissolve the strychnine and acid hydrobromate of quinine, by the aid of a gentle heat. Then add

Syrup of bromide of iron, sufficient to produce.....1 pint.

Each fluid drachm contains $\frac{1}{64}$ grain of strychnine, 1 grain of acid hydrobromate of quinine, and about 4 grains of bromide of iron.

Dose: $\frac{1}{2}$ to 1 fluid drachm.

SYRUPUS HYPOPHOSPHITUM COMPOSITUS.

*Compound Syrup of Hypophosphites.**

Take of—

Quinine (alkaloid)	20 grains.
Strychnine	1 "
Hypophosphorous acid, 30 p. ct	2 fluid drms
Strong solution of hypophosphite of iron	3 fluid oz.

Dissolve and add

Hypophosphite of calcium	80 grains.
Hypophosphite of manganese	40 "
Hypophosphite of potassium	40 "

Dissolve, filter, and add

Syrup sufficient to produce	1 pint.

Mix.

Each fluid drachm contains $\frac{1}{120}$ grain of strychnine and $\frac{1}{8}$ grain of quinine.

Dose: $\frac{1}{2}$ to 2 fluid drachms.

SYRUPUS IPECACUANHÆ ACETICUS.

Acetic Syrup of Ipecacuanha.

Take of—

Vinegar of ipecacuanha	1 pint.
Refined sugar	2½ pounds

Dissolve by the aid of a gentle heat. Specific gravity about 1·33.

Dose: $\frac{1}{4}$ to 2 fluid drachms.

* This differs essentially from the syrup of same name in "National Formulary."

SYRUPUS PRUNI VIRGINIANÆ.

Syrup of Wild Cherry.

Take of—

Wild cherry bark, No. 20 powder	3 oz.
Refined sugar, in coarse powder	15 "
Glycerin	1½ fluid oz.
Distilled water, a sufficient quantity.	

TINCTURA CALENDULÆ FLORUM.

Tincture of Marigold Flowers.

Take of—

Marigold flowers, dried, in No. 20 powder	4 oz.
Proof spirit, a sufficient quantity.	

Moisten the powder with eight fluid ounces of the menstruum, and macerate for twenty-four hours. Then pack in a percolator, and gradually pour proof spirit upon it until 1 pint of tincture is obtained.

Dose: 5 to 20 minims.

TINCTURA CAPSICI FORTIOR.

Stronger Tincture of Capsicum.

Take of—

Capsicum fruit, in No. 40 powder	10 oz.
Rectified spirit, a sufficient quantity.	

Moisten the powder with a suitable quantity of the menstruum, and macerate for twenty-four hours in a closed vessel. Then pack in a percolator, and gradually pour rectified spirit upon it until 1½ pint of tincture are obtained.

Dose: 1 to 3 minims. Principally used externally.

TINCTURA EUONYMI.

Tincture of Euonymus.

Take of—

Euonymus bark, in No. 20 powder	4 oz.
Rectified spirit	1 pint.

Moisten the powder with a suitable quantity of the menstruum, and macerate for twenty-four hours; then pack in

a percolator, and gradually pour rectified spirit upon it until 1 pint of tincture is obtained.

Dose: 10 to 40 minims.

TINCTURA PHOSPHORI COMPOSITA.

Compound Tincture of Phosporhus.

Take of—

Phosphorus.....12 grains.
Chloroform..... 2½ fluid oz.

Place in a stoppered bottle, and apply the heat of a water-bath until dissolved. Then add the solution to

Ethylic alcohol.....12½ fluid oz.

Shake well. This tincture should be preserved from the light, in accurately-stoppered bottles.

Each fluid drachm contains $\frac{1}{10}$ grain of phosphorus.

Dose: 3 to 12 minims.

UNGUENTUM OLEO-RESINÆ CAPSICI.

Ointment of Oleo-Resin of Capsicum.

Take of—

Oleo-resin of capsicum.....1 oz.
Yellow wax..... ½ "
Benzoated lard.....4 "

Melt the wax and lard at a low temperature, add the oleo-resin, mix thoroughly, and, if necessary, strain through muslin. Stir until cold.

Phar. Jour. and Trans., Sep. 8.

AMERICAN PHARMACEUTICAL ASSOCIATION.

The city of Detroit having been selected for holding the thirty-sixth annual meeting, the local Secretary, Mr. James Vernor, efficiently aided by a local committee, had made ample preparations for the accommodation of a large number of visitors, and for a very extensive exhibition of drugs, chemicals, galenicals and other objects of interest to pharmacists and druggists. The exhibition was held in the Detroit Rink, on Larned street, a spacious building which was handsomely fitted up for the purpose, the various collections being shown to advantage. Numerous visitors were constantly in attendance examining the interesting, and in many instances, instructive exhibits.

The sessions were held in the armory of the Detroit Light Infantry, located on Congress street, the entire building having been secured for the use of the Association. The parlors were specially reserved for the ladies; but one of the parlors was subsequently used for holding the meetings of the Sections while the general sessions took place in the large hall on the top floor, which was also utilized for the reception tendered to the officers of the American and of the Michigan State Pharmaceutical Associations, and for the hop following the reception on Wednesday evening.

At the Hotel Cadillac the Council held a short meeting on Sunday evening and a protracted session on Monday morning for the reception of the various reports and for arranging the business which was to come before the Association.

The first general session was held on Monday afternoon at 3.30 o'clock, when President Lloyd called the Association to order, and was followed by Rev. Dr. Henderson, who opened the sessions with prayer. The mayor of the city being prevented from being present, Hon. Wm. E. Maybury, on behalf of the city of Detroit made an address of welcome, stating that the pharma-

ceutical manufactories of Detroit were the pride of the city, and as colaborers of these institutions the members of the association were welcomed. He spoke of the advancement of pharmacy from the time when the virtue of medicines seemed to be governed by their quantity and bitterness, until now the little tasteless capsule has no terror for the patient and is taken with as little concern as soda water at the soda fountain. The association was welcomed from the heart of humanity. No man so welcome as the physician who strives to alleviate and remove pain, but the labors of the physician would be futile if the high calling of the pharmacist were not discharged with a sense of high duty. Vice-president Alexander responded briefly, accepting the hospitalities tendered, and Professor Judge was then requested to read the President's annual address.

The address is very lengthy and contains a number of suggestions and propositions which would form ample material for reflection and discussion at the annual meetings. In the introductory portion the President suggests whether full membership should not be restricted to "actual apothecaries, personally engaged in dispensing medicines;" and he expresses the conviction that the association had been "designed by its founders. . . . to be made up of apothecaries only." The latter is evidently a mistake; for at the organization of the association in 1852 men were present who were *not* carrying on the apothecary's business, and the constitution then adopted distinctly admits to membership "all pharmacists *and druggists* who etc." Moreover on motion of one of the original members, Mr. S. M. Colcord, at the meeting in 1855 the words were introduced "whether in business on his own account, *retired from business*, or employed by another;" and in 1867 the Business Committee, Dr. Squibb chairman, brought in an amendment which was unanimously adopted, making eligible "those *teachers of pharmacy, chemistry and botany*, who may be specially interested in pharmacy and materia medica." These are facts on record in the published proceedings for the years named, and express the views held by the founders and the early members of the association.

The various problems mentioned, and comments made by the President may be briefly stated as follows:

1. Members should encourage apprentices in obtaining pharmaceutical education and in making pharmaceutical preparations.

2. The influence of modern pharmaceutical factories is sketched.

3. The drift of the times points to the necessity of the apothecary of the future graduating in medicine as well as in pharmacy.

4. Can pharmacists pay a percentage to physicians for prescription favors?

5. The prescribing, under assumed names, of mixtures, keeping the formulas secret, is not consistent with pharmaceutical ethics, and is neither elevating nor dignified in either participant.

6. Legislative action requiring the label of each patent medicine to plainly indicate the composition.

7. Counter prescribing considering the right of an individual to *self*-medication, and the qualification of the recommender.

8. Patents for improvements on apparatus applicable to the preparation of pharmaceuticals and chemicals.

9. Patents for synthetical processes for medicinal agents.

10. The sale of patented, trade-marked or copyrighted preparations.

11. The manufacture of secret mixtures for popular self-medication.

12. The selling of secret preparations by apothecaries.

13. The manufacture of secret preparations in bulk for others.

14. The exclusive use of a trade-marked name invented for a simple mixture.

15. The protection by trade-mark or copyright for prints, labels, etc.

16. The copyrighting of books written exclusively for pharmacists and physicians.

17. The dispensing of preparations protected by copyright, patent or trade-mark. [See No. 10].

18. The manufacture of pharmaceutical preparations, for which the ingredients are given, but the working process is withheld.

19. Property in advantageous methods for preparing valuable constituents from crude drugs.

20. The use by the pharmacopœia of the results of individual research.

21. Is it proper to label a substance as though manufactured by us when in reality it is only selected or perhaps purified?

22. The introduction into the pharmacopœia of liquid preparations representing in two minims one grain of the drug.

23. The election, besides a president, of a presiding chairman with parliamentary experience and knowledge.

24. Rigid examinations by state boards and education of assistants at colleges of pharmacy.

25. Salaries to the secretaries of sections.

The President's address was referred to a committee consisting of John Weyer of Cincinnati; J. L. Lemberger of Lebanon, Pa., and Geo. W. Sloan of Indianapolis. The report on credentials being presented showed that delegates had been appointed by the Colleges of Pharmacy of California, Chicago, Cincinnati, Louisville, Maryland, Massachusetts, New York, Ontario, Philadelphia, Pittsburg, St. Louis and Washington (National); by the State Pharmaceutical Associations of Alabama, Arkansas, Connecticut, Dakota, (North and South,) Delaware, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Massachusetts, Michigan, Minnesota, Missouri, Nebraska, New Hampshire, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Rhode Island, Tennessee, Virginia, Wisconsin and of the Province of Quebec; by the Alumni Associations of the Chicago, Cincinnati, Louisville, Philadelphia and St. Louis Colleges of Pharmacy; and by the local associations of Cleveland, Connecticut River, N. H., Dauphin Co., Pa., Detroit, and Kings Co., N. Y., and the St. Louis Club of Microscopists. When the Nominating Committee was subsequently appointed, it was found that from ten of the states mentioned no delegates were present, or they had not arrived. The delegations of each state named two members to serve on the Nominating Committee, and the President appointed from the Association at large the following members not delegates: A. E. Ebert, William Dupont, E. Bocking, John Ingalls and J. F. Judge.

The Secretary of Council read the names of 126 persons proposed for membership all of whom were invited to join; the total number of new members proposed and elected at the meeting was 215. Afterward the minutes of Council since the last meeting of the association were read. These minutes referred to the incorporation of the Association under the laws of Congress, the publica-

tion of the National Formulary, the examination of the treasurer's books, the reports of committees, etc. The minutes were approved and the reading of the reports postponed until the next session. Several amendments to the by-laws were offered and laid over, and an invitation from the California College of Pharmacy was extended for holding the next meeting in San Francisco. This brought forth a proposition for the appointment of a committee of fifteen —twelve to be nominated from the floor, and three by the chair—whose decision as to the time and place of the next meeting should be final, provided that two public hearings be given. The proposition was voted down and a motion for the appointment of a committee of three prevailed, this committee to report at the next session. Messrs. Painter, Remington and Bedford were appointed this committee, and an adjournment was had until Tuesday morning.

Second Session.—The first business transacted after the approval of the minutes of the first session and of the Council's session, was the election of the following officers for the ensuing year:

M. W. Alexander, St. Louis, Missouri, president; James Vernor, Detroit, F. Wilcox, Waterbury, Conn., A. A. Yeager, Knoxville, Tenn., vice-presidents; S. A. D. Sheppard, Boston, treasurer; J. M. Maisch, Philadelphia, secretary; and Henry Canning, Boston, C. L. Keppler, New Orleans, and Emlen Painter, New York, members of Council for three years.

A cable message conveying "fraternal greetings from British Pharmaceutical Conference meeting at Bath," and signed by the President, F. Baden Benger, was read, and ordered to be acknowledged. It is strange that when the secretary stated that the Conference was no longer in session, none of the members present appeared to be better informed; hence the acknowledgment was not sent by cable, but subsequently by letter.

Greetings by telegraph were also received from ex-President William Saunders, then sojourning at Victoria, British Columbia, in the service of the Canadian government.

Prof. Diehl read the introductory portion of his report on the progress of pharmacy, which created some discussion. On the alleged substitution by Berlin apothecaries, Dr. James, of St. Louis, stated that prescriptions ordering bogus remedies had been gotten up by homœopathic practitioners and sent to homœopathic dispensaries, at some of which the prescriptions were dispensed. The intercourse between physicians and pharmacists in scientific societies was discussed by Dr. F. E. Stewart, Prof. Remington and Dr. Eccles, and the good results for both professions from such an intercourse were pointed out; it was contended that the progressive members of both professions favored such a step, and that a section on pharmacy in the American Medical Association should have a counterpart in a section on therapeutics in the American Pharmaceutical Association.

Mr. De Forest read the final report of the Committee on National Formulary, giving an account of the manner in which the work was finished, and making various suggestions, those relating to a future revision of the Formulary being embodied in two resolutions which were adopted as follows:

Resolved, that a Committee on National Formulary be appointed at the Annual Meeting following the publication of a revision of the work, the said committee to hold office, unless otherwise directed by the Association until their

successors are appointed at the Annual Meeting succeeding the issue of a revision, and to report at each meeting of the Association.

Resolved, that the Council of the American Pharmaceutical Association shall have authority, upon the recommendation of the Committee on National Formulary, to make all necessary arrangements for the publication of a revised edition, and to provide for its distribution and sale.

A motion was also made by Professor Painter, that a heartfelt vote of thanks be extended to those pharmacists not members of the committee who had rendered assistance. The motion was amended so as to include likewise the members of the committee, and to make special mention of its chairman, Dr. Chas. Rice. In this amended form the resolution was passed.

Pending a motion for the appointment of a new Committee on National Formulary, the matter was referred to the scientific section. The Association ordered the publication of the Formulary with the Proceedings for 1888.

The various reports coming from Council were now read. The Committee on Publication reported the total cost of publishing the Proceedings for 1887 to have been $3794.52, and suggested that hereafter the Proceedings as a general rule, be distributed by mail also in the larger cities to avoid delay. Of the National Formulary two editions of 3,000 copies each had been exhausted in ten days each, and the third edition had been put on the market August 31st.; to comply with the direction to "sell it at the lowest price possible after paying all expenses," the calculation was made so close that the profit on the cost of paper, presswork, binding and shipping was less than four cents each for the first 3,000 copies, and about 11 cents each on the first 6,000 copies sold; the actual average profit, however, was somewhat greater, and is expected to ultimately reimburse the Association for all expenses connected with the Formulary.

The reports of the Treasurer and of the Auditing and Finance Committees account for a total income, during the financial year of $12,656.49 which includes the cash balance on hand in 1887; the total disbursements during the year, including $4000 transferred to the life membership fund, were $10,280.42, leaving cash on hand $2,376.07. In addition to this there are permanent funds, invested in U. S. bonds, the interest alone being used; the market value of these funds was as follows: Ebert fund $796; Centennial fund $1,427.10, and Life Membership fund $9,124.72.

The Committee on Membership reported the roll to contain 1257 members, against 1291 the preceding year, the decrease being mainly due to a number of resignations in previous years, and to 21 deaths during the preceding years, the latter including four former presidents, Lincoln, Luhn, Moore and Roberts.

The report of the Committee on the time and place of the next annual meeting stated that invitations had been received from St. Paul and Minneapolis jointly, from Asbury Park, New Orleans and San Francisco, and that the Committee was unanimous in proposing San Francisco for holding the meeting in 1889. The report was adopted by a vote of 47 against 7 nays; and a Committee of five was directed to be appointed to make all arrangements, with power and to report to the Council.

The amendments previously offered to the by-laws were now considered and adopted as follows:

Chapt. vi., Art. iv. The Secretary of the Council may, or may not, be a member of Council.

Chapt. vi., Art. viii., Sect. 2, relating to the proposition of members was merely changed in phraseology.

Chapt. viii., Art. iv. The life membership fees were fixed for members after 25 years at $30, after 30 years at $20, and after 35 years at $10.

The Section on Commercial Interests held two sessions on the afternoon and evening of Tuesday, Sept. 4. The chairman, A. H. Hollister, and Secretary, J. W. Colcord, were re-elected. The secretary's report suggested that the State Associations be requested to send to this section any suggestion for trade improvement.

A resolution laid over from last year was adopted as follows:

Resolved, That the Secretary of the Section on Commercial Interests be directed to correspond with manufacturers and dealers requesting them to label their products in conformity with the official nomenclature, and to designate strengths by the specific gravity or percentage strength, abolishing arbitrary signs and obsolete standards, such as "F" marks and Beaumé, and that the co-operation of the National Wholesale Druggists Association towards securing said result be solicited.

A committee consisting of Frederick Wilcox, Waterbury, Conn., J. F. Patton, York, Pa., and A. K. Finlay, New Orleans, was appointed to examine and report upon exhibits.

A resolution offered by Mr. Canning requesting manufacturers not to sell rebate goods to firms retailing the same in their wholesale stores, was referred to a committee consisting of Messrs. Canning, Hallberg and Eccles. The report presented by that committee at the evening session was fully discussed and led to the indefinite postponement of the subject.

There was some discussion about the substitution of preparations by different manufacturers, but no action was taken.

At the evening session the Michigan Pharmaceutical Association, whose annual meeting was being held the same week, was present in a body. The chairman, Mr. Hollister, read his annual address dwelling upon the necessity of pharmacists employing all the means which the educational advantages of the present time afford. The apprentice should be of unimpeachable character, have at least a thorough common-school education, and should be afforded opportunity and assistance for improvement. The relation of the physician and the pharmacist should be defined in a straightforward business-like way. Drug stores being classed as hazardous and extra-hazardous, the question of fire insurance calls for concerted action. The tariff on medicines calls for careful consideration, and the $25 United States revenue tax should be wiped out. The cultivation of medicinal plants is of economic importance, and should be encouraged by Congress. The "cutting craze" was alluded to, and the question was asked: Why should wholesalers injure the business of their correspondents and customers by retailing goods at less than marked rates, and even at rates as contemptible as those offered by the scalper?

Mr. Frank Wells read a paper on the liquor question, as affecting pharmacists.

The different recommendations in the chairman's address were discussed and concurred in. A motion by Mr. Hallberg in favor of the abolition of the special internal revenue tax on the sale of liquor was adopted. A similar resolution had been passed in 1887.

There was some discussion on cutting of prices, on enforcement of pharmacy laws, on definition of "the best general exhibit," and kindred subjects. The Chairman completed the Committee on Commercial Interests by appointing Messrs. Eliel, of Indiana; Holzhauer, of New Jersey, and Searby, of California, and the section subsequently adjourned.

The Section on Scientific Papers held two sessions on Wednesday, and one on Thursday forenoon. The Chairman, Mr. T. Roberts Baker, and the Secretary, Dr. A. B. Lyons, being both absent, the Section was called to order by the third member of the committee, Prof. Good, who presided until, before the final adjournment, the new committee was installed consisting of Prof. E. Painter, New York, chairman; Prof. Whelpley, St. Louis, secretary, and Dr. Eccles, Brooklyn. The papers read were as follows:

Artificial Salicylic Acid; by E. E. Ewell and A. B. Prescott. The paper treated of methods for estimating the quantities of homologous acids present with salicylic acid, and referred first to acidimetry by means of $\frac{1}{100}$ normal alkali in the presence of phenolphthalein. The acids taken into consideration were salicylic acid (137·67), hydroxytoluic acid (151·64) and hydroxy-xylenic acid (165·61); the experimental results showed that with the use of sufficiently delicate and verified instruments 4 or 5 per cent. of hydroxytoluic acid may be detected, other interfering impurities being absent.

Another method tried was conversion into phenols by distilling 15 gm. of the acid with an equal weight of lime; the distillate—if necessary liquefied by adding a little water—was mixed with an equal volume of 9 per cent. sodium hydrate, and the clear mixture diluted with water, until after stirring there remained visible precipitation. The method can be made effectual probably with closer results than those obtained by acidimetry. Preliminary experiments with mixtures of cresylic and carbolic acids had given the following results:

Volume per cent. of cresol in the distillate.	Calculated weight per cent. of hydroxy-toluic acid distilled.	After adding an equal volume of 9% sol. of soda, number volumes of water added before precipitation.
5	4·9	6·7
10	9·8	6·0
15	14·8	5·25
20	19·8	4·5
25	24·7	4·0
30	29·7	3·6
35	34·7	3·3
40	39·7	3·1
45	44·7	2·8
50	49·7	2·6

The third method tried was separation of the acids by the difference in solubility of their calcium salts; but the results were not promising.

Calycanthus seed.—The seeds of Calycanthus glaucus, *Willd.*, are reported, in the Southern states, to be poisonous to animals, producing symptoms resembling those following the use of strychnine. Dr. R. G. Eccles has isolated from the seeds a minute quantity of a new alkaloid, *calycanthine*, which is slightly

soluble in water, but very soluble in ether or chloroform, while the salts are insoluble in the latter liquids, but freely soluble in water. Strong nitric acid colors the alkaloid green; and potassa saponifies it, producing a crystallizable alkaloid and a strong sweet odor resembling ylang-ylang. The bark, leaves and flowers of calycanthus contain essential oil, but the seed is free from it.

Quinine mask.—L. F. Stevens, after making over one hundred test experiments for masking the taste of quinine, succeeded in making an efficient preparation, which was admitted into the National Formulary under the name

Aromatic Elixir of yerba santa.—It is made by agitating together 8 fluidounces each of compound elixir of taraxacum and syrup with 240 grains of powdered pumice, then adding 1 fluidounce of fluid extract of yerba santa; after a few hours decant and filter through cotton; agitate the filtrate with 80 grains of magnesium carbonate, and after several hours filter. A fluid drachm of this elixir, mixed by agitation with 5 grains of quinine sulphate, completely covers the taste of the latter. The elixir, as well as its mixture with quinine, improves with keeping.

In the discussion following the reading of this paper it was stated that the compound elixir of taraxacum of the National Formulary covered the taste of quinine completely, but that its taste was not very agreeable.

Peppermint Oil.—Prof. A. B. Stevens found the polarizing power of menthol, both Japanese and American, to be from—95° to—100°; the dementholized oil of peppermint has a polarizing power lower than that of the oil from which it was obtained. The volatile oils of camphor, pennyroyal and turpentine have a right rotation, and when mixed with oil of peppermint lessen the levogyre rotation of the latter. A drachm of nitric acid agitated with a drop of pure oil of peppermint will produce a permanently yellow mixture, which in the presence of oil of camphor becomes red in 15 or 20 minutes. Experiments were also made with the decolorizing of iodine by oil of peppermint, the reaction being interfered with by the presence of alcohol.

Professor Trimble's papers on *Catechu* and on *precipitated ferrous sulphate* are published in full in this number.

Nomenclature of Pharmaceutical Preparations is the title of a short suggestive paper by C. S. Hallberg, directing attention to the different strengths of the various preparations of one class, and pointing out that the relative strength might likewise be indicated in the name by the use of Latin numerals. These, combined with the last syllable of the present class name, might then do service for indicating the drug strength of the preparation; accordingly we would have—

Drug Strength by Volume.		Drug Strength at One Hundred.	
100 = Cen-ture.	30 = Tri-ture.	100 = Cen-tract.	30 = Tri-tract.
50 = Quin-ture.	20 = Vin-ture.	50 = Quin-tract.	20 = Vin-tract.
40 = Qua-ture.	10 = De-ture.	40 = Qua-tract.	10= De-tract.
			5 = Quinque-tract.

The subject was referred to the Committee on the Revision of the U. S. Pharmacopœia, and in the discussion which followed it seemed to be generally admitted that a more precise nomenclature might be devised, at least for preparations of different strength or made with different menstruums, which are at present designated by the same generic name.

Loco-weed.—Astragalus mollissimus is the plant which in Kansas and other localities is known as loco weed, and which has been believed to be poisonous to horses and cattle. Occasionally a similar plant, having a hairy pod—probably *Astragalus Bigelowii*—is said to be equally poisonous; and in certain localities, where these species do not grow, *Oxytropis Lamberti* is regarded as loco- or poison weed. Professor Sayre's investigations, extending over a period of three years, render it very doubtful whether these plants really possess any poisonous properties, since chemical investigation has thus far failed to reveal the presence of a poisonous principle, and the plant or extract given to animals, or taken by man, produced no bad effects. Occasion is taken in the paper to point out the importance of scientific investigation, and reference is made to an enactment of Colorado, offering a bounty of 1½ cents for each pound of loco-weed (dried) dug up at least three inches below the surface of the ground, with the view of eradicating it. About $200,000 have thus far been expended by the State for this purpose, and now it seems probable that the plant is harmless, and that the animals have died from some other cause. Reference was also made in the discussion on this paper to different species of Kalmia and other plants, which are reputed to be poisonous to animals, but of whose deleterious effects satisfactory evidence has not been produced.

Subsequently a resolution was passed earnestly recommending to the legislatures of Kansas and other States in which the loco-weed grows, that they give Professor Sayre their hearty indorsement for support for the further investigation of the loco poison.

The Section discussed also the measures desirable for securing at some future time a thorough revision of the National Formulary, and arrived at conclusions which were expressed by the Association at its second session. In regard to the selection of the committee for attending to this work, on motion of Professor Remington, the Section requested the President of the Association, to appoint five members from the central portion of the United States, and one member from each State Association to act as a Committee on the National Formulary. Other resolutions were passed requesting the President to appoint a committee to visit the American Medical Association with the view of getting that body to adopt the National Formulary as authority for all unofficinal preparations contained therein; also requesting the Permanent Secretary to suggest to each State Pharmaceutical Association the appointment of a committee to bring the same subject before the State Medical Society.

Natural and Artificial Spring Waters was the title of a paper read by Mr. Enno Sander, who spoke also of the attempts made by a New York firm to prevent the manufacture and sale of artificial Carlsbad water and salt. Mr. Hallberg offered a resolution declaring it to be the right and privilege of pharmacists of this country to prepare and sell any preparation for which a formula is contained in the "National Formulary."[1] The expediency of passing such a resolution was questioned by Messrs. Sayre and Remington, and it was finally withdrawn.

Phosphomolybdic Acid for the quantitative estimation of alkaloids.—Mr. H. W. Snow reviewed the work done by others, and after himself going, experimen-

[1] This refers more particularly to formulas 322 and 323 for *Sal Carolinum factitium* and *Sal Carol. fact. effervescens.*—Editor.

tally, over the ground, concludes that *aconitine, emetine, strychnine*, and to a certain degree also *hydrastine*, may be estimated with a fair degree of precision and ease by Mayer's reagent, and that no advantage would probably be gained by changing to phosphomolybdic acid; on the other hand, *atropine, cocaine, gelsemine, physostigmine, pilocarpine*, and to a lesser extent *coniine*, seem to offer greater encouragement, though in varying degrees, according to the means at hand for estimating them, or the immediate object of the estimation.

Comparative Pepsin testing was discussed by Mr. F. A. Thompson, comparing the requirements of the U. S., British and German Pharmacopœias. A modification of the U. S. process is suggested, reducing HCl from 0·47 to 0·30 per cent. by weight, using the albumen after passing through a No. 30 brass sieve, digesting for 6 hours at 104° F, and during that time stirring constantly and uniformly. Instead of employing an excess of albumen and weighing that not dissolved during the process, it is proposed that the requirements should be that, under the conditions named, a definite amount of albumen used in the experiment should be completely dissolved. Considerable discussion followed the reading of this paper in regard to the strength of acid used, the temperature of digestion, the presence of peptone, the processes of manufacture and the use of antiseptics in the process.

Morphiometric Assay of Opium was discussed in a paper by Mr. J. F. Geisler. The principal modifications suggested for the U. S. P. process are the reduction of lime from 3 to 1·5 gm., of chloride of ammonium from 3 to 0·8 gm., and of alcohol from 5 to 3 cc. These modifications increase the amount of pure morphine obtained, by lessening the loss from its solubility in the mother liquors.

Sponges was the title of a paper by Dr. Rosa Upson, in which their growth, collection, preparation for the market, and uses were briefly described.

A Still for Volatile Oils was described by Mr. A. M. Todd, who exhibited also a model for such an apparatus. Stills and condensers, and the conditions for distilling and condensing properly, were discussed, and in reply to a question, Prof. Prescott stated that in many of the charcoal furnaces in Michigan provision was made for the condensation of vapors which in other localities were allowed to escape, and that large quantities of *wood alcohol* were thus obtained.

Assays of powdered ipecacuanha, by John E. Pennington, had been made according to the process described by Dr. A. B. Lyons (see AMER. JOUR. PHAR., 1885, p. 538); the 15 samples examined yielded results indicating between 1·04 and 1·46 per cent. of emetine.

Mercurous iodide has been prepared in the pure state by E. Sœtje, who states in his paper that careful attention to the details is necessary to obtain it by double decomposition. Prof. A. B. Stevens stated that with solutions of certain strength the iodide will be green, while under altered circumstances it will be yellow.

Arsenic in medicinal bismuth salts was determined by R. E. Hawkes by weighing the mirror of the metal obtained under Marsh's plan, as used by Gautier, and improved by Chittenden. Of seven samples of *bismuth subcarbonate* one was free from arsenic, one yielded a mere trace, and the others ·0026, ·0080, ·0106, ·0133 and ·0660 per cent. One sample of *bismuth subnitrate* was free, and another contained a trace of arsenic; five other samples yielded ·0026, ·0053, ·0133 and ·0133 per cent.

Limit tests for calcium tartrate in cream of tartar was the title of the last paper by C. W. Bœtcher, read by Prof. Stevens. The object was to ascertain the correctness of the pharmacopœial test, and its adaptation to the detection of smaller percentages of the impurity by changing the proportion of water for dilution; the results were as follows:

No.	Dilution.	Per cent. Calcium Tartrate.	Time of Cloudiness.	Distinct Turbidity.
1	100 cc.	2	⅓ minute.	1 minute.
"	150 cc.	2	2 minutes.	4 minutes.
"	200 cc.	2	None in 5 minutes.	
2	200 cc.	4	¾ minute.	1¼ minutes.
"	300 cc.	4	1¼ minutes.	2 minutes.
"	400 cc.	4	None in 3 minutes.	
3	500 cc.	6	1 minute.	1⅓ minutes.
"	600 cc.	6	1½ minutes.	2 minutes.
"	700 cc.	6	2⅔ minutes.	3–5 minutes.
4	600 cc.	8	⅔ minute.	1¼ minutes.
"	700 cc.	8	1½ minutes.	2 minutes.
"	800 cc.	8	2 minutes.	3 minutes.
5	700 cc.	10	⅓ minute.	1 minute.
"	800 cc.	10	1 minute.	2 minutes.
"	1000 cc.	10	1⅓ minutes.	2⅔ minutes.

Professor Prescott stated that Mr. Boetcher had also examined a large number of samples of cream of tartar procured from drug stores, nearly all of which answered to the pharmacopœial tests, a few only containing about 8 per cent. of calcium tartrate; but the cream of tartar procured from groceries was very badly adulterated with terra alba, alum and other substances, only about 40 per cent. of these samples being found of tolerably good quality.

Dr. S. S. Garrigues, on being invited, spoke of the *salt industry* of Michigan, with which he had been connected for many years; and especially referred to a very simple method, introduced by him many years ago, for removing the deliquescent admixtures with which table salt is often contaminated by washing them out by means of a saturated solution of sodium chloride.

The report of the committee on prize essays for the past year not having come to hand, it was ordered to be referred to Council in case it should be received after adjournment.

The new officers were then installed, and the Section adjourned.

Section on Pharmaceutical Education.—Professor Judge presided, and Professor Whelpley acted as secretary. Short papers on this subject by Dr. Eccles, Prof. Sayre and Prof. Bastin were read. The first paper referred chiefly to the objects and methods of education in general, while Prof. Sayre treated of the importance of a good English education as a part of pharmaceutical education. Prof. Bastin's paper dwelled upon education before entering college, upon methods of instruction, upon the necessity of increased laboratory work, and upon the desirability of lengthening the courses in pharmaceutical colleges to two terms, of forty weeks each. The discussions touched upon different problems, and the system of memorizing, followed in many public schools and in some colleges, was branded as the bane of education. On the question of

preliminary training a resolution was passed that a committee of three be appointed to determine a standard of the preliminary examination to be recommended to colleges of pharmacy.

The officers of the Section, constituting the Committee on Pharmaceutical Education for the ensuing year, are Prof. Bedford, New York, chairman; Prof. Sayre, Kansas, secretary, and Prof. Patch, Massachusetts. The Section then adjourned.

The Section on Pharmaceutical Legislation was called to order by Secretary De Forest, and in the absence of the chairman, the President of the Association, Mr. Alexander, was invited to the chair. There being no report from the chairman of the Section, Mr. C. W. Day, chairman of the special Committee on Interchange of Certificates of Pharmacy Boards, reported verbally that the matter had been laid before the different boards, but had met with so little favor that it would probably be better to further discuss it before outlining a plan. The boards in favor of the proposition appeared to be Nebraska, Georgia, District of Columbia, Wisconsin, Minnesota, Pennsylvania and Kings County, New York. Opposed to the proposition were Wyoming, New Jersey and New York State. Ohio, Massachusetts and Iowa claimed to have no power in the premises, and New Hampshire, Missouri and Virginia were not prepared to take action. From about one-half of the States no reply had been received. After some discussion a resolution was passed that the chair appoint a committee of five to draw up a general outline plan for the interchange of certificates of the different boards of pharmacy.

After a recess, Mr. A. E. Ebert presided, when Mr. C. W. Day, Illinois, was elected chairman; J. N. Hurty, Indiana, secretary, and Rob. J. Brown, Kansas, associate, Committee on Legislation for the ensuing year.

A resolution was passed that in the future the Legislative Section should not meet simultaneously with another Section. Also, one urging upon State Pharmaceutical Associations the necessity of exercising great care in selecting competent and educated pharmacists for the State Board of Pharmacy.

After installing the officers the Section adjourned.

The Ninth Session of the Association, the final one of the meeting, was held Friday morning, September 7, when, after the reading of the minutes, and the proposition of new members, the officers elected for the ensuing year were installed.

The Committee on the President's Address presented a brief report, stating that they had found it impossible to carefully consider the suggestions made by the President; but that prompt attention should be given to the 25th suggestion, and that the twenty-second, referring to a new line of preparations, be referred to the Committee on the revision of the Pharmacopœia. Regarding the other suggestions the Committee requested the privilege to report to the Council. These propositions were adopted.

Mr. Finlay moved a reconsideration of the vote by which San Francisco was selected as the place for the next meeting. The motion to reconsider was lost by a vote of 30 ayes to 34 nays.

On motion of Prof. Bedford, the Permanent Secretary was empowered to arrange the schedule naming the dates and hours at which the sessions of the Sections shall be held at the next meeting.

Prof. E. W. Runyon was elected Local Secretary for next year.

The following Committees were appointed by the President:

Committee on National Formulary: C. L. Diehl, C. S. N. Hallberg, L. Eliel, C. T. P. Fennel and A. Conrath.

Committee on Revision of the Pharmacopœia: L. C. Hopp in place of A. B. Lyons, removed to Honolulu.

Committee on Arrangements: E. Painter, K. Simmons, T. N. Jamieson, R. J. Brown and E. Sander.

Committee to visit the American Medical Association: Prof. Remington, K. Simmons, C. A. Heinitsh (two more members to be appointed).

The Section on Commercial Interests presented the report of the Committee on Exhibits, recommending that the prize for "the best general exhibit" be awarded to Hance Bros. & White, of Philadelphia, and the prize for the "best exhibit of pharmaceuticals made by a pharmacist in his own shop" to Feldkamp & Hallberg, of Chicago. The recommendations were adopted.

After passing the customary votes of thanks the Association adjourned to meet next year in San Francisco at a time to be designated by the Committee on Arrangements.

THE BRITISH PHARMACEUTICAL CONFERENCE.

After an interval of twenty-four years the British Pharmaceutical Conference has revisited Bath. Although this city was not, strictly speaking, the birthplace of the association, for that name applies more correctly to Newcastle-on-Tyne, which is to be visited next year, Bath is the place in which the Conference first met as an organization, in 1864, since which time its roll of membership has increased from one hundred to nearly two thousand names. Such a result, besides being evidence of the fitness of the association for survival, bears unmistakable testimony to the wisdom and energy with which its business has been conducted during the interval, no small portion of the credit for which is due to Mr. F. Baden Benger, who for so many years performed the duties of one of its Honorary Secretaries. It was therefore only natural that on the occasion of Mr. Benger assuming the presidential chair the members should have rallied heartily to his support and secured the success of the meeting. Following the practice of the two previous years, the initial gathering of the members of the Conference took the form of a Conversazione, which was held at the Grand Hotel on Monday evening, September 3d. This gathering was marked by the attendance of representative pharmacists from all parts of the country, including several of the President's former colleagues on the Board of Examiners.

On Tuesday morning, at ten o'clock, the Conference met for business in the large room at the Grand Hotel. As a preliminary the members had the pleasure of listening to some hearty words of welcome from the Mayor of the city, who expressed his regret that his duties would prevent him from attending the meetings of the Conference or accompanying the members on their excursion to Tintern Abbey. The President gracefully acknowledged this "official" recognition of the Conference, and after the receipt of several letters of regret at inability to attend from a number of old friends of the body had been announced, and a list of delegates appointed to attend the Conference by various

Associations read, the President called upon Mr. Naylor, one of the Honorary Secretaries, for the report of the Executive Committee.

If it be true that a social body is happy in proportion as it remains without a history, the British Pharmaceutical Conference might be considered thrice blessed, since its history, as recorded in the annual reports, has been usually of the briefest and most uneventful nature. From this rule the report presented by the Executive Committee to the Conference showed no variation. The only subject of an "exceptional" character reported upon was a proposition that members attending the Conference should be furnished with copies of the papers to be read, which the Executive has decided to be impracticable, principally, as it appears, for financial reasons. Other subjects referred to in the report are certain changes of colonial secretaries, the issue of a new edition of the Unofficial Formulary, and grants in aid of research. In connection with the gift of books provided by the Bell and Hills Fund a difficulty has arisen similar to that which occurred at Southport, consequent upon there being no local pharmaceutical association in existence in Bath to receive the books. They have therefore been presented to the Bath Royal Literary and Scientific Society, subject to the condition that they shall at all reasonable times be accessible to resident pharmacists.

It is somewhat difficult to gather from the Financial Statement the exact relative financial position of the Conference as compared with last year; but taking into account only the money assets and liabilities, and ignoring any increase in the stock that may have accrued, there seems to have been a decrease on the credit side of about £27. This would be more than accounted for by the falling off in members' subscriptions received, from £611 13*s.* 9*d.* to £534 13*s.* 6*d.* On the other hand the effect of this falling off has been lessened by a reduction in the cost of the production of the 'Year Book,' postage, and in other items. The publication of the Unofficial Formulary has also been a source of profit to the Conference. But it is evident the membership is now hardly large enough to provide the means for the present rate of expenditure, and it behooves all those who wish to maintain the Conference in a vigorous condition to do what they can to recover the ground that has been lost during the last two or three years in respect to its numerical strength. The adoption of the Report of the Executive Committee and of the Financial Statement was moved by the President, seconded by Mr. G. S. Taylor, and carried unanimously.

The President then proceeded to deliver what proved to be a very long, but very interesting address. He commenced by humorously describing the meeting as the celebration of "the silver wedding of pharmacy and good fellowship," and after an appropriate eulogium of the late Henry Deane, the first President of the Conference, he referred briefly to the growth of the Conference and some other changes during the twenty-five years that have passed since its formation. The average annual death-rate, he said, had fallen considerably, a fact which pharmacists as scientific men could understand even if the credit for it was mainly due to others. But in the lightening of the "burden of pain" which had taken place during the same time, it was claimed that pharmacists have played an important, if sometimes an unrecognized part. The speaker then proceeded to consider the relation of pharmacy to the pharmacist who has adopted the calling as a means of living. It was pointed out that formerly pharmacy was combined with a trade in the preparation and supply of a large

number of sundries which has in recent years been diverted to a large extent into other channels, with a corresponding diminution in the pharmacist's means of living. In discussing the question how the loss was to be made good, Mr. Benger uttered some well-merited strictures upon the growing tendency among medical men to delegate their prescribing to manufacturers, and spoke of it as a reproach to pharmacy that so many of the preparations dispensed by medical men, and even prescribed by physicians, or purchased and used by the public on their own responsibility, should be manufactured by persons who possess no legal qualification to practise pharmacy in this country. In fact, he is of opinion that the wholesale manufacturer of medicines should possess the same legal qualifications as the retail pharmacist. Notwithstanding, however, the severe competition, Mr. Benger believes there is remunerative work to be found by the skilled pharmacist who looks for it in the right direction. This would seem, in his opinion, to lie in the tendency to differentiation in pharmaceutical production. "No man will produce all the preparations he uses or sells, but he may make most of them, and it is open to him to endeavor to make a special reputation for some. If he can succeed in doing anything better than it has been done before he will find no difficulty in obtaining better payment for his work." This argument was the more forcible, since the speaker himself is a notable illustration of the truth of it. The success or failure of the pharmacist of the future will, in Mr. Benger's opinion, largely depend on his fitness to accommodate himself to altered and modified conditions,—among which will be a diminished demand for his services as a mere distributor of medicines,—and his own recognition of the fact that outside pharmacy proper, but nevertheless allied to it, are fields for skill, industry, and enterprise in which his technical and scientific knowledge may be profitably utilized. All this led up naturally to a consideration of the important subject of the nature of the early training which shall best equip the pharmacist as a scientific man. In order to throw light upon this Mr. Benger has been in communication with various eminent men as to the conditions of pharmaceutical apprenticeship or pupilage and of the subsequent or qualifying examinations in other countries. In this way he has become possessed of a mass of information upon these points from France, Germany, Austria, Belgium, Italy, Switzerland, Russia, Sweden, Denmark, Holland, the United States, Canada and Australia. One thing that must have struck those who heard the *précis* of this information laid before the Conference, and will strike all those who read it for themselves, is the almost unbroken uniformity with which in nearly every country evidence is required of an advanced scholastic education as a preliminary to a pharmaceutical career, as well as subsequent systematic training of the pupil in the sciences upon which his calling is based. Those who have objected to the minute dose of curriculum which it is proposed to administer in this country will find no support in these reports from the experts in the countries mentioned, where the consensus of practice, at least, is in its favor. After pointing out the inferences to be drawn from these reports, Mr. Benger concluded by urging on all entering the pharmaceutical ranks that they should regard scientific education, not as a troublesome impediment placed in their way by a reckless Parliament, prompted by a pedantic society, but as the very key to future success. The address was listened to with interest throughout, and the ripples of laughter that followed the utterance of the quiet

bits of humor that occur in it here and there proved that the audience was in continued sympathy with the speaker. At its close, upon the motion of Mr. S. R. Atkins, seconded by Mr. Bottle, Vice-President of the Pharmaceutical Society, and supported by Mr. Martin, the Conference awarded to Mr. Benger an enthusiastic vote of thanks.

The President mentioned that the American Pharmaceutical Association was simultaneously in session in the city of Detroit, and suggested that the officers of the Conference should be authorized to send to it by cable a fraternal greeting. The suggestion was heartily adopted.

Report of Formulary Committee.—The Conference then proceeded to the reading and discussion of reports and papers, the first taken being the report of the Unofficial Formulary Committee, which was read by the Chairman, Mr. Martindale. This report enumerated briefly the new and modified formulæ that appeared in the proof copies of the edition of the Formulary of 1888, as submitted to the Conference by the Committee. The majority of these formulæ are new. They include a vinegar of ipecacuanha and a syrup made from it; an elixir and a compound tincture of phosphorus; an elixir of saccharin; a liquid extract of triticum; syrups of codeine, bromide of iron, hydrobromates of iron and quinine, hydrobromates of iron, quinine and strychnine, and wild cherry; tinctures of marigold flowers and euonymus, and a stronger tincture of capsicum, and an ointment of the oleoresin of capsicum. Emulsion of cod liver oil is the subject of an improved formula, in which the yolk of egg is introduced to assist the emulsification. The preparation of tincture of quillaia is incorporated with the preparation of the solution of coal tar, for which it is required. Lastly, there is a formula for a "stronger solution of hypophosphite of iron," which has involved corresponding modifications in the formulæ for the hypophosphite preparations. The adoption of this report and the authorization of the issue of a new edition of the Formulary was moved by the President, who referred to the fact that 2250 copies of the first edition had been sold, and that it had been a source of income to the Conference; the motion was seconded by Mr. Robinson in very complimentary terms and agreed to unanimously. This was followed by a well-earned vote of thanks to the Unofficial Formulary Committee, and especially to the Chairman, Mr. Martindale, and the Secretary, Mr. Naylor, which was heartily accorded on the motion of Mr. Plowman, seconded by Mr. A. H. Mason.

Aconite.—Mr. E. M. Holmes then presented a report on the progress made in the experiment he had undertaken to carry out for the Conference in the cultivation of a definite form of *Aconitum Napellus*, with a view to furnishing suitable material for a more trustworthy chemical investigation of the root than has hitherto been possible. He described three forms that he has selected—from Colchester, St. Neot's, and Riverhead—as approximating in his opinion to typical plants, and recounted the observations made during the cultivation of specimens in his own garden. Some rough experiments, in which the relative activity of the plants was estimated by the intensity of the numbing sensation produced upon the tongue on chewing the seeds, seemed to indicate the desirability that a separate chemical examination of each form should be made. Some interesting information was also given as to the probable yield of root, and the best method of propagation under the conditions of cultivation. The report gave rise to an interesting discussion, in which Professor Hillhouse and

Messrs. Groves, Ransom, Plowman and Greenish took part, at the conclusion of which a unanimous vote of thanks was accorded to Mr. Holmes.

Morphine Derivatives.—After an interval of luncheon, which was served in the Guildhall, a report was presented by Messrs. Dott and Stockman on the Chemistry and Pharmacology of some Morphine Derivatives, which was a continuation of one presented to the Conference last year. The first paragraph discussed the composition of the compound that was obtained in the artificial production of codeine from morphine, and was first described as dimethylmorphine, the correctness of which name is disputed. Apart from chemical considerations the authors consider that its physiological action is so different from that of methylmorphine or codeine, as to render the constitution represented by that name improbable, and the authors appear to look upon it as methocodeine They also refer to certain acetyl and benzoyl derivatives, methyl-sulphuric-acid-ether and chlorocodide. The topics of the report were necessarily somewhat recondite, but testimony to the value of the research as helping to place medicine on a scientific basis was borne by Dr. Thresh and Mr. Plowman. Incidentally Dr. Dott remarked that the opium alkaloids do not differ from one another in their physiological action so much as is generally supposed, but might be said to form groups differing rather in the intensity than in the quality of their action.

Extraction by Pressure—the paper next read—was a plea by Dr. Symes for depending rather upon the operation of pressing than on that of percolation in the extraction of certain drugs. Restoration of moisture to the dry drug, and subsequent expression, Dr. Symes considers to be the treatment specially adapted to leaves—of which senna is a type—where there is a bulky material and a danger of injuring the active principle if percolation and evaporation be adopted. The plan recommended for senna is to digest the leaves for from four to six hours in a covered vessel with a mixture of equal parts of rectified spirit and water, in the proportion of a pound of leaves to sixteen fluidounces of menstruum; afterwards to put the mixture into bags and subject it to pressure of fifty tons or more until it ceases to yield liquid. The marc is then broken up, water added, and pressure again applied, until the product amounts to sixteen fluidounces for each pound of leaves used. In this way, according to Dr. Symes, a very active preparation can be obtained, and *Convallaria Majalis*, *Damiana* and *Hamamelis* are instanced as suited for treatment upon the same principle. Dr. Symes's experience in the treatment of senna by pressure rather than by percolation was practically confirmed by Mr. T. B. Groves and Mr. Conroy, but on the other hand other speakers had more faith in percolation and evaporation at a low temperature.

Oil of Cajeput.—In the next paper read, Mr. West, lecturer on Botany and Materia Medica at the Bradford Technical College, reported the results obtained in the examination of fourteen samples of commercial oil of cajeput. The color of these samples ranged from "pale bluish green," which is the character given in the British Pharmacopœia, to "full bluish green;" the specific gravity at 15·5° C. from 0·9226 to 0·9240; and the boiling point from 174° to 174·5° C. No difference in odor could be detected between the samples, even on boiling. It would therefore appear that the article at present supplied as cajeput oil is fairly uniform in character. Copper was found in every sample, which agrees with Mr. Histed's experience in 1872 (*Pharm. Jour.* [3],

ii. 804). Another sample that had been kept in stock for a long time was pale brown, and the specific gravity only 0.9194. Guibourt says that an oil distilled by himself from *Melaleuca* leaves had a fine green color; but Histed says that ordinary cajeput oil after being redistilled is white, though it becomes again green if placed in contact with copper turnings. Mr. West incidentally called attention to the fact that for histological purposes this oil is to be preferred to oil of cloves in transferring sections from alcohol to Canada turpentine, as it penetrates more quickly than oil of cloves, and is expelled more readily from the turpentine afterwards.

Cotton-Seed Oil in Lard.—The practice of adulterating lard with cotton-seed oil, which appears to have developed recently in the United States to an enormous extent, has rendered very desirable the publication of a good test for the detection of the fraud. In the next paper read, on "Lard: its Adulteration with Cotton-Seed Oil and Detection thereof," Mr. Conroy gave the results of his experiments in this direction. The nitric acid test proposed some years since by Mr. Conroy for the detection of cotton-seed oil in olive oil proved not quite satisfactory when applied to lard, and he prefers a modification of Milliau's test, dependent upon the reduction of silver nitrate. This consists in adding twenty grain measures of a test solution, containing five parts of silver nitrate and one part of nitric acid (sp. gr. 1·42) in one hundred parts of rectified spirit, to about one hundred grains of the lard previously melted at a water-bath temperature in a test-tube and keeping the mixture in boiling water for five minutes. Pure lard remains perfectly white, but if adulterated with cotton-seed oil the lard assumes a more or less olive-brown color according to the amount of the adulterant present, 1 per cent. causing a distinctly perceptible change. The reading of this paper was followed by an animated discussion, in the course of which Mr. W. Thompson expressed an opinion that whilst freedom from blackening might be accepted as evidence of the absence of cotton-seed oil from a sample of lard, the reduction of silver nitrate was not necessarily evidence of its presence

This brought the business of Tuesday to an end, and many of the members availed themselves of opportunities afforded them by the courtesy of the authorities for visiting the Abbey Church and the Grand Pump Room and Baths.

Insect Powder.—The business of the Conference on Wednesday morning commenced with the reading of a paper by Mr. John Kirkby, on Insect Powder. With a view to the detection of the introduction of foreign substances into insect powder the author has submitted the flower heads of authentic specimens of *Chrysanthemum cinrariæfolium*, the reputed source of Dalmatian insect powder, to a microscopical examination with a view to the detection of histological elements characteristic of the species. These he believes he has found in the pollen grains and the epidermal papillæ of the ligulate florets, of which drawings were shown. The papillæ differ somewhat even from those of the ligulate florets of *C. roseum*, the source of Persian insect powder, and could be used as a means of detecting that admixture. The paper gave rise to a lively discussion, and the necessity for some test for the determination of the purity of this article was evidenced by a statement by Mr. Conroy to the effect that reputed Dalmatian insect powder may be bought at a much lower price per pound than the flowers from which it is supposed to be ground. Mr. Conroy also pointed out

that the activity of a sample of insect powder could be readily tested by trying it directly on flies.

Cassia Tora.—The results of a "Proximate Analysis of the Seeds of *Cassia Tora*," by Mr. W. Elborne, formed the subject of the next paper. These seeds and the leaves of the same plant are used in India as a remedy for ring-worm and other skin diseases, and Dr. Dymock has suggested that they may contain chrysophanic acid. In Mr. Elborne's opinion their medicinal activity is due to a substance which he describes as resembling emodin. From the alcoholic extract he states that he obtained a glucoside, which he calls "potential emodin;" but this view is rather conjectural than the result of satisfactory experiment, and, as pointed out by Mr. Naylor, the subject requires further investigation.

The Solubility of Citrate of Caffeine was the subject of a paper read by Mr. Gerrard, in which he criticised the official description of the drug in the British Pharmacopœia. Having endeavored to make a ten per cent. solution for convenience in dispensing, he found that out of five samples purchased not one was sufficiently soluble, and none of them corresponded to the official statement that the preparation should form a syrupy solution with a little water. Using a sample prepared by himself Mr. Gerrard met with the same difficulty. His experiments led him to the conclusion that citrate of caffeine has a mean solubility of about 1 in 30. He is therefore of opinion that the statement in the British Pharmacopœia is a mistake that has also found its way into other works.

Caffeine.—In the succeeding paper, by Mr. J. Moss, an instance was given in which an article represented to be "Citrate of Caffeine, Old P.B.," consisted simply of caffeine, without a trace of citric acid. No explanation could be obtained of the designation, and evidently in dispensing such an article as citrate of caffeine, as nearly as possible twice the dose of caffeine intended would be given.

Laboratory Notes, by Mr. R. Wright. The first note was on *Acetum Ipecacuanhæ*, and described, apparently, the work that led up to the formula adopted by the Unofficial Formulary Committee. The second was on Liquid Extract of Cascara. In the endeavor to prepare a tasteless extract, it was found that when lime was used a pale colored extract was produced apparently destitute of any laxative property. But when a mixture of the bark with magnesia was extracted with dilute alcohol, the preparation obtained was free from bitterness, and appeared to act as powerfully as the bitter extract. The next note was on Syrupus Ferri Phosphatis, and described a process for the preparation of an improved syrup containing a smaller proportion of acid and at the same time admitting of dilution without deposit of phosphate. For that purpose, the author recommends to dissolve 360 grains of iron wire in 6 fluidounces of syrupy phosphoric acid, sp. gr. 1·50, and 9 ounces of distilled water, filtering the solution into 72 fluidounces of simple syrup and adding water to make up 96 fluidounces. The last note, on Unguentum Hydrargyri Oxidi Flava, described the results of experiments made to supply the want of an authoritative formula. The B. P. formula for Unguentum Hydrargyri Oxidi Rubri did not give the author a satisfactory product. By melting yellow wax with soft paraffin in the proportion 1 to from 7 to 16 according to the prevailing temperature, a satisfactory ointment may be obtained. The discussion following the reading of this paper turned principally upon the efficacy of the "tasteless" cascara extract, and dis-

closed the existence of a wide difference of opinion as to the result of treatment of the extract for the removal of bitterness.

Compound Syrup of Hypophosphites.—The next paper, by Messrs. Dott and Inglis Clark, gave the results of the examination of four samples, three obtained from commercial sources and one prepared by themselves. Sensible deficiencies in some or all of the constituents were ascertained, justifying the suspicion that this preparation does not always contain all that is represented upon the label.

Oil of Mentha arvensis.—The object of the next paper, by Mr. J. Moss, was to place on record certain characters of oil of *Mentha arvensis* distilled from plants grown in England by himself. The oil was found to have a decidedly yellow color; the specific gravity at 62° F. was 0·9107; it commenced to boil at 339° F, the temperature rising 402°F. The specific gravity of the redistilled oil was 0·9117.

Cephaëlis Tomentosa.—Mr. Ransom then read a note on the examination of the root and stem of *Cephaëlis tomentosa*, said to be used in Trinidad for the same purposes as the root of *C. Ipecacuanha*, though the root is totally unlike that drug both in external appearance and internal structure. The presence was ascertained of traces of an alkaloid which gave a reaction with mercuric chloride, resembling that of emetine. But as the physiological action of sixty grains of the root was inappreciable, the amount of alkaloid present must be very small.

Citrate of Iron and Quinine.—A paper by Mr. R. H. Davies, gave the result of twenty-one experiments undertaken to ascertain the amount and precise nature of the alkaloid present in commercial samples of this preparation. The total alkaloid varied from 11·42 to 19 per cent. Upon the basis of the precipitated tartrates obtained it was inferred that some of these samples contained considerable quantities of amorphous alkaloid, and these were cases in which the preparation had been obtained from foreign sources. In reference to the Pharmacopœia formula, Mr. Davies suggests that the most important conclusion to be drawn from his work is that a preparation containing 16 per cent. of alkaloid cannot be obtained as directed. That point, however, had already been settled by Mr. Fletcher, and it would appear that Mr. Davies is unaware of the fact that the requirement of the British Pharmacopœia has been reduced to 15 per cent. The Conference then adjourned to luncheon, which was again served in the Banqueting Room at the Guildhall.

Size of Pills.—In the next paper, Mr. N. Asten brought under the notice of the Conference the question recently broached in these columns as to the size of pills containing very small quantities of active medicines, and suggested the desirability of adopting a uniform standard for the sake of obviating inconveniences that now result from such pills being made of different sizes by different dispensers. In the discussion that followed, reference was chiefly made to the weight of the pill, although it is evident that the uniformity to be secured for the satisfaction of patients would apply rather to the size than to the weight. Although no definite decision was arrived at, the preponderance of opinion appeared to be in favor of a minimum size, when possible, of one grain.

Carthagena Bark.—The next paper was by Mr. Hooper, and consisted of a summary of the history of Carthagena bark and of the experiments connected with the introduction of Carthagena bark trees into the Nilghiri Cinchona

Plantations of the Madras Presidency. The result of the experiments has been to show that the bark from the plants now being cultivated in the Nilgiris as yielding Carthagena bark is commercially valueless, stem-bark examined from two trees, one five and a half and the other six years old, yielding no quinine and the root-bark only 1.1 per cent.

Hybridization of Cinchonas.—This paper by Mr. D. Hooper, forms an important contribution to the knowledge of the conditions affecting the cultivation of cinchona, and is of a class that can only be contributed by an investigator holding an exceptional position like the Government Quinologist. In the cinchona plantations of the Madras Government there are two well defined species of *Cinchona—C. succirubra* and *C. officinalis*—the bark from the former containing less quinine with more cinchonidine and cinchonine than that from the latter. Between these two species there are also many hybrids, and as the hybrids frequently assume the quicker growing character of the succirubra parent it was interesting to ascertain how far and in what direction the hybridization affected the production of alkaloid. Fifty samples of succirubra bark examined yielded an average of 6·5 per cent. of total alkaloid, and in 100 parts of this the quinine ranged from 17·6 to 26·8 parts, the average being 22·2 parts, whilst the average of the cinchonidine was 36·1 parts. Only five out of the fifty samples failed to comply with the requirements of the British Pharmacopœia for an official bark that it should yield between 5 and 6 per cent. of total alkaloid, not less than half of which shall consist of quinine and cinchonidine. From fifty samples of *C. officinalis* bark the average yield of total alkaloid was 5·25 per cent., but in 100 parts of this the quinine ranged from 48.2 to 62·1 parts, average 55·9 parts, while the cinchonidine only averaged 26·7 parts. The results obtained in analyses of twenty-five hybrid barks showed more total alkaloid with proportions somewhat different from the theoretical quantities calculated for a typical hybrid on the assumption that it would partake equally of the character of the two parents. The quinine ranged from 30 8 to 55·3 per cent. of the total alkaloid, the figures for cinchonidine increasing more or less with the decrease of the quinine, and the two together constituting four-fifths of the whole alkaloid. The highest amount of quinine in the succirubra barks was only equal to the lowest in the hybrid barks, whilst that of the highest of the hybrids merged into the lowest of the official barks.

This brought the reading of papers to an end, and the next business was the presentation of books provided by the Bell and Hills Fund. In accordance with what has been already mentioned, in the absence of a local association the books were presented to the Bath Royal Literary and Scientific Society, and they were accepted with a hearty acknowledgment by the President of that institution, Mr. Murch, who curiously enough filled the office of Mayor of the city at the time of the previous visit of the Conference in 1864.

An invitation was then given to the Conference by Mr. Martin and Mr. Clague, speaking in the name of the pharmacists of Newcastle-on-Tyne and district, to visit that city next year. The deputation drew a glowing picture of the allurements presented by the Tyne district, and upon the motion of Dr. Thresh, seconded by Mr. Woolley, the invitation was cordially accepted.

The Unofficial Formulary Committee was then reappointed, on the motion of the President, seconded by Mr. Conroy, and authority was given to the Com-

mittee in cases of emergency to publish formulæ provisionally, provided that they were approved of by seven of its members, each formulæ being subject to revision before formal publication.

The Conference then proceeded to the choice of officers for the ensuing year, and on the recommendation of the Executive the following were unanimously elected:

President—C. Umney.

Vice-Presidents—M. Carteighe, S. Plowman, C. Symes and N. H. Martin.

Treasurer—W. Martindale.

Honorary General Secretaries—J. C. Thresh and W. A. H. Naylor.

Other Members of the Executive Committee—J. E. Brunker, M. Conroy, R. H. Davies, D. B. Dott, A. W. Gerrard, J. Harrison, T. Maben, B. S. Proctor and F. Ransom.

Local Secretary—T. M. Clague.

Auditors - J. Wilson and T. Rheeder.

Votes of thanks were then heartily accorded to Mr. H. Hutton, of Bath, who had so ably performed the duties of Local Secretary; to the Mayor and Corporation of Bath, for having lent the Banqueting Hall of the Guildhall for luncheons; to the Royal Literary and Scientific Society, for having opened its rooms to the members during their stay; and to Mr. Radway for the use of the assembly room at the Grand Pump Room Hotel for the meetings of the Conference. Last, but not least, an enthusiastic vote of thanks was passed to Mr. F. B. Benger for the able and courteous way in which he had filled the office of President. In acknowledging this compliment, Mr. Benger said that it was probable that one of the results of the visit of the Conference to Bath would be the resuscitation of the local pharmaceutical association, towards which Mr. S. R. Atkins had promised to assist by the delivery of an address. And thus finished a meeting of the Conference, which if not so largely attended, was equal in other respects to the most successful of its predecessors.

On Thursday morning the weather seemed to offer little prospect of an enjoyable excursion, but by the time fixed for starting the rain had ceased, and under a bright sky a large number of members and ladies gathered at the railway station whence they were conveyed by a special train to Chepstow. On their arrival the Castle was visited under the guidance of Mr. C. H. Clarke, who had undertaken to give assistance in that way. At one o'clock the party adjourned to luncheon at the "Beaufort Arms Hotel;" the chair was taken by the President, and before leaving the table he proposed the health of Mr. Hutton as a recognition of the great services he had rendered in making arrangements for the excursion, as well as in carrying out the other work devolving upon him as Honorary Local Secretary. The drive to Tintern Abbey and the passage of the Wyndcliffe were much enjoyed, and the return journey was made by special train, which brought the party back to Bath almost exactly at the hour which had been fixed.—*Pharm. Jour. and Trans.*, September 8.

Methylal has been used hypodermically in doses of 0.03 to 0.12 gm., by Dr. Krafft (*Ther. Monatsh.*), in asthenic cases of alcoholism; the results were satisfactory (see also AM. JOUR. PHAR., 1887, p. 198).

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

We acknowledge the reception of the following pamphlets, containing essays and theses by French pharmacists. All were published in Montpellier, except where otherwise noted.

Contribution à la Photométrie scolaire. Par Albert Cure. Paris: J. B. Ballière & Fils. Pp. 47 and 3 plates.

A contribution to the photometry of schools.

De l' Aluminium et de ses Sels. Par E. Causse. Pp. 64.

On aluminium and its salts.

Étude sur les Eaux minérales du Cantal. Par E. Védrines. Pp. 62.

Study on the mineral waters of (the department of) Cantal.

Des Antipyrétiques de la série aromatique. Par Henri Provot. Pp. 94.

On the antipyretics of the aromatic series.

Aniline et Fuchsine. Par E. Geoffroy. Pp. 78.

Aniline and fuchsine.

Dosage de l' Urée. Tableau donnant les Coefficients de correction des Volumes gazeux. Par E. F. Geffroy. Pp. 50 and 1 plate.

Estimation of urea; with a table giving the coëfficients of correction of the volumes of gases.

Contribution à l' Étude de la Flore et de la Matière Médicale de la Sénégambie. Par Camille Sambuc. Pp. 104.

Contribution to the study of the flora and materia medica of Senegambia.

Les Ménispermées et leurs Produits. Par Auguste Dreuilhe. Pp. 46.

The menispermaceæ and their products.

Étude sur la Recherche des Graines étrangères dans le Blé et ses produits. Par Marc Henon. Pp. 52 and 2 plates.

Study on the recognition of foreign seeds in grain products.

Des Algues pharmaceutiques. Par H. B. Lautié. Pp. 80.

On the pharmaceutic algæ.

Des principaux Camphres d' Origine végétale. Par Lucien Dérue. Pp. 56.

On the principal camphors of vegetable origin.

Volksthümliche Deutsche Arzneimittel-Namen. New York, 1888, pp. 32.

Popular German names of medicaments.

This pamphlet is a reprint from Dr. F. Hoffmann's Pharmaceutische Rundschau and may be obtained by applying to Messrs. Lehn & Fink, enclosing a two-cent stamp. The carefully prepared list contains not only those German names which are generally used in pharmaceutical works, but also those which are employed in certain localities only.

Cocaine dosage and cocaine addiction. Cocaine Toxæmia. By J. B. Mattison, M. D., Brooklyn, N. Y. Pp. 44.

Two papers reprinted from the *Lancet* (May 23, 1887), and *La Tribune Médicale* (January, 1888).

The Extra Pharmacopœia with the Additions introduced into the British Pharmacopœia, 1885. By Wm. Martindale, F. C. S., etc. Medical references and a therapeutic index of diseases and symptoms by W. Wynn Westcott, M. B. Lond., etc. Fifth edition. London: H. K. Lewis, 1888. P. 462.

The usefulness of this little work is attested by the fact that five editions became necessary within as many years. In February 1888 we have noticed the fourth edition; the one now before us has been enlarged by 46 pages, chiefly through the introduction of the numerous modern remedies and medicinal substances, like antifebrin, acetophenone, phenacetine, iodol, salol, salufer, saccharin, lanolin, mollin, methylal, etc., etc. This new edition has been very carefully prepared, and being as comprehensive and reliable in the information imparted as its predecessors, will be equally useful.

The Physician's Manual of the National Formulary. Compiled by C. S. Hallberg, editor of the Western Druggist, etc. Chicago: Feldkamp & Hallberg. Pp. 47.

It is intended for physicians, to inform them of the strength and applications of the preparations admitted into The National Formulary, this information consisting mainly of the notes contained in the Formulary, together with condensed statements of the ingredients, editorial notes, etc. On page 18 a fluidram of liquor ferri iodidi is stated to contain about 15 grains of ferrous iodide; it should be 45 grains.

Price and Dose Labels of Drugs and Preparations generally kept in a retail pharmacy including, besides those officinal in the last revision of the U. S. P., many other new and rare drugs and chemicals, with the Latin, French and German synonyms. Edited by Hans M. Wilder. New York: J. H. Vail & Co., 1888.

This is of the same scope as Lochman's "Dose and Price Labels" of which we noticed the second edition in 1887, p. 319. In Mr. Lochman's labels prominence is very properly given to the Latin titles, while in Mr. Wilder's labels the English names have been printed in large and bold type, and the Latin names relegated to a place of secondary importance. The addition of French and German synonyms will prove of great convenience to many. That the information collected together on these labels, including medical properties and doses, is correct and trustworthy, may be taken for granted from the compiler's well known carefulness.

Report on the Experiments made in 1887 *in the treatment of the downy mildew and the black-rot of the grapevine;* with a chapter on the apparatus for applying remedies for these diseases. Prepared by F. Lamson Scribner, under the direction of the Commissioner of Agriculture. 8vo, pp. 113.

Sugar-producing Plants. Record of Analyses made by authority of the Commissioner of Agriculture, under direction of the Chemist, 1887-88. Sorghum: Fort Scott, Kan.; Rio Grande, N. J.—Sugarcane: Lawrence, La. Together with a study of the data collected on sorghum and sugarcane. 8vo, pp. 132.

The foregoing two pamphlets are issued by the department of agriculture, and are numbered, the former Bulletin, No. 5, Section of Vegetable Pathology, and the latter Bulletin, No. 18, Division of Chemistry.

Science of Photography at home and abroad. Published by Jas. W. Queen & Co., Philadelphia. Price $1 per year.

A journal published since April in monthly numbers, handsomely printed and profusely illustrated. It describes improvements in apparatus and processes, including patents relating to photography; the proceedings of photographic societies are reported, and well known writers contribute to its pages articles on subjects of art in general, and of photography in particular. It is intended for the professional photographer as well as for the amateur.

OBITUARY.

Robert Coulton Davis, Ph. G., class 1844, and a member of the Philadelphia College of Pharmacy, died in this city August 24th. His graduation thesis on cantharides was published in this Journal, 1844, page 81. He was in business for many years at 16th and Vine streets.

Dr. James Kemble, Ph. G., class 1861, died in Philadelphia, suddenly, August 3. After carrying on the drug business for a number of years, he studied medicine, and of late years was a homœopathic practitioner.

Harry L. Pfund died at the residence of his parents in Philadelphia, July 19, aged 20 years. He was an apprentice in the store of John A. Martin, Ph. G., and a diligent and attentive student at the College, where he successfully passed a partial senior examination last March.

John C. Savery, Ph. G., class 1851, died suddenly at Winona, Ohio, August 1st, while on a visit to his brother. He left the drug business many years ago for the practice of law, his office having been lately at 731 Walnut street.

Thomas J. Scott, Ph. G., class 1846, died at Lexington, Ky., March 22, aged 59 years. He was formerly in business in Philadelphia, but having a fondness for art he devoted his time during the latter part of his life to painting and became noted particularly as a painter of trotting horses.

Richard Anthony Proctor, well known throughout the civilized world as an astronomer, died in New York City of yellow fever, September 12. The deceased was born in Chelsea, England, March 23, 1837, and at the age of seventeen became a clerk in a London bank, devoting his leisure time to the study of his favorite science, mathematics. Subsequently he attended King's College, London, and St. John's College, Cambridge, and graduated in 1860. Many of his essays and books are strictly scientific, more particularly the earlier ones, like "Double Stars" (1863), "Saturn and its System" (1865), "Gnomonic Star Atlas," and "Handbook of the Stars" (1866); but, in 1870, with his work on "Other Worlds than Ours; the plurality of worlds studied under the light of recent scientific researches," he entered the field of popular science, in which he has been one of the best known authors of popular astronomical works, and of contributions to magazine literature. Mr. Proctor visited the United States in 1873 on a lecture tour, and of late years had an observatory at Oak Lawn, Marion County, Florida, where he spent, with his family, a portion of last summer, arriving in New York September 10, on his way to England. The general fatigue of which he complained rapidly developed into yellow fever; on the night of September 11 he was removed from the Westminster hotel to the Willard Parker Hospital, where he died on the following day.